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THE NEW VOLUME.

WITH this issue begins Volume 58 of a periodical the establishment of which was almost contemporary with the introduction of the locomotive into the United States. Readers have a greater or less acquaintance with the condition of incipient railroad development in this country at the end of 1831 and the beginning of 1832, from their perusal of the series of articles reviewing early numbers of the JOURNAL, now being published in its columns. A comparison between then and now, however general, strikes the mind with admiration at the astonishing growth of the railroad interest in this country and in the civilized world elsewhere, within sixty years. No parallel to this astonishing progress in the use of any one invention can be found in the pages of industrial history. In the diversity of its utility and its wonderful results, the mere mention of which would exhaust the space appropriated to this article, the locomotive is the greatest of all inventions; and no country, perhaps, has profited by it more than the United States. To the railroad must be attributed, for instance, that expansion of agricultural industry which is the foundation of the national wealth.

The JOURNAL for more than half a century has given periodically the details of railroad progress in the United States, during the greater part of this long period by weekly publication. One year ago the proprietors determined upon a change which has been found advantageous, namely, its appearance at monthly instead of weekly intervals. The change has been found to be an improvement, the view of a month's business being more generally acceptable to readers than that of a week's. We are looking forward to a year of greater success than even that of the past, under the continuance of the system of publication once a month only.

The appearance of the Index to the volume completed last month, is unavoidably delayed. It will be ready in time to accompany the May number. Subscribers may rely upon this promise. We regret exceedingly their present disappointment in the matter of the Index to the last volume; and respectfully suggest that they postpone having its numbers bound until after the publication of the May issue, which will certainly be supplemented by a carefully-compiled Index of Volume 57.

Arrangements have been made for the publication in the next and following issues, of articles on practical railroad subjects by pens well qualified for the task. The number of these articles and their subjects will be determined very much by the indications reaching us through the mails.

And this leads us to say, as our final paragraph on the present occasion, that we cordially invite contributions for publication under the head "Communications." All who have anything to say of interest in connection with railroad matters are reminded that the AMERICAN RAIL-

ROAD JOURNAL is ready still to give their utterances circulation. If every reader will coöperate with the editor and publishers, the volume of the JOURNAL opening with the present issue, can easily be made the best in its long history.

PRESIDENTIAL.

WE are daily reminded that this is the presidential year. In the first place, the daily papers are full of politics, and many of them are discussing the merits and demerits of some possible candidate for that high office. We are again made aware of the peculiar character of the year by the interest taken in local elections by the different parties, each party being as anxious as possible to control the majority of wires, no matter how insignificant some of them may be. Business men bring the fact to our attention by daily growling about the poor business they are doing, and oracularly stating that it is ever thus in the presidential year. Those who have charge of our churches are not slow in uttering their complaints about non-attendance at prayer meetings, and blame the presidential year for their small congregations.

Now to the political writer of this Journal these complaints seem alike nonsensical. The daily papers have a perfect right to discuss the merits and demerits of any man seeking office just the same as they have to discuss the efficiency and inefficiency of our navy. Public men, like ships of war, arsenals, forts, etc., are public property, and the people must be informed what kind of property they are investing in when solicited for their suffrages. The daily press has this task to perform, and if any presidential candidate objects to having his short-comings exposed, let him withdraw from the contest.

In regard to the politics discussed by the daily press, we have a few words to say. There are certain issues that are settled, and there are others that are dead. It is a waste of ink and paper to talk about Abolitionism, for this issue was settled years ago. Whether right or wrong, slavery has been abolished in this country and that is the end of it.

Aboriginism is way behind the times, for there are so few Aborigines that any school boy having mastered the addition table can count them without trouble. The few remaining descendants of the original tribes can be as well taken care of by one party as the other.

The questions of Union and Disunion have had their day, and have been settled by the flowing of as many million ounces of blood as millions of dollars out of the pockets of those who engaged in settling the contest. The intelligent traveler who goes South as well as North beholds no more solid South or solid North. He beholds only the United States of America. Concession and Secession, Destruction and Reconstruction are questions that have been laid to rest in the graves of the men who waxed eloquent advocating them. In this piping time of peace, one may well ask what are the issues of the hour, and young men must give answer. Old men are too full of the past to be alive to the needs of the present, and the young men must dictate what they need, and not take what the old men have to offer.

Among the foremost issues of the day are the tariff question, the banking system, the currency question, and some few others we need not mention.

The tariff question is one of such vital importance to all classes of society, on account of this country being able to produce so much more than it can consume, that the party which first gains an intelligent conception of it, will be the best entitled to the confidence of our citizens. We leave this issue here as we hope to treat of it in a subsequent number. The banking and currency questions will be discussed in an editorial under the heading of Bullion in our next number.

In regard to the possible candidates now being discussed, we have nothing to say. We have lived long enough to see the machinery of this government move right along, with the martyred LINCOLN being borne to his grave. We have seen his successor stand a trial when the effort was made to impeach him. We have seen the government almost without a responsible head during GARFIELD'S long struggle between life and death. We have seen men occupying the presidential chair, to whom no smart business man would give a thousand dollars a year for his services as a clerk in his business. In fact, going over the list of men who have been elected to this high office, the firm belief has taken hold of us that the majority were third-rate men. One thing alone is certain, and that is, that on the 4th day of March some one will be at the door of the White House, ready to take the oath, and whether he be first-rate or third-rate, the machinery of the government will move right along, because it is a government controlled by the governed.

In regard to the presidential year interfering with business, we are disposed to question the accuracy of the statement, for this year at least. There are too many other good and sufficient reasons for the dull aspect of the present and the outlook for the future. The great middling class to which tradesmen look for business, is rapidly dwindling away, a few going over to the ranks of the wealthy, but the great majority swelling the ranks of the poor. Some thinkers are of the opinion that the tariff has much to do with this condition. Of one thing we are assured, that times have changed since we were boys, when brains and energy could carve a way to fortune. It takes capital to do this now. With the whole world for a market in which to buy and sell, we might renew the middling class, and make it possible for a man with a little capital to succeed, and thus in making customers increase the volume and profits of business. The complaint of ministers and religious people that the presidential year depletes the attendance at their churches, is the veriest bosh imaginable. Men are like animals, and will go to the crib where they can find the food they need. When a man's mind is filled with enthusiasm for the welfare of his country, he don't care to hear about the lost tribes of the house of Israel. It makes no difference to him whether the whale swallowed Jonah or Jonah the whale. What he wants is to be instructed as to the needs of the people, and his duties as a God-fearing, man-loving citizen.

It is no use for any of us to blame the presidential year for the losses, calamities, or sorrows that come to us. They have all come in other than presidential years, and will come any year when circumstances, time and place conspire to induce them.

The presidential year teaches but one great lesson and that is, that every man is expected to do the best he can for the welfare and prosperity of his country.

The Late Augustus Schell.

At a special meeting of the boards of directors of the New York Central and Hudson River Railroad Company; the Lake Shore and Michigan Southern Railway Company; the Michigan Central Railway Company, and the New York and Harlem Railroad Company, jointly assembled at the Grand Central Depot, on the 28th day of March, 1884, the death of the Hon. Augustus Schell was announced as having occurred on the previous day, whereupon it was resolved that the following minutes be entered at length upon the records of each corporation:

Augustus Schell, who died in New York city the 27th inst., was born at Rhinebeck, Dutchess county, August 1, 1812. He was graduated with high honors from Union College, and adopted the profession of the law. An able and upright counsel, he soon entered upon a large and successful practice. Always deeply interested in public affairs, he has been for forty years one of the controlling minds of his party and in positions of great power, responsibility and trust. By wise and patriotic administration he strengthened the confidence of his friends, and received the official approval of his political enemies. Modest and unobtrusive in his charities, his election as trustee and president of many of our most beneficent institutions, and his continuance in such trusts for over a third of a century, are enduring testimonials to the benevolent work of his life. In 1862 Mr. Schell entered upon his railway career, as a director of the Harlem Railroad Company. The railway development of the country was then comparatively in its infancy, but he foresaw the future and embarked his fortune in and gave his time and mind to these great enterprises. In the most important part of this work during these eventful twenty-five years he has been an important factor. His clear judgment, unswerving fidelity and ever hopeful temper were the help and reliance of his associates during the whole of this long period. He possessed in the highest degree those rare qualities of common sense and unerring discernment which made him invaluable as an adviser, and makes his loss irreparable. His firmness and fixedness of purpose in sustaining his principles in prosperity and adversity, in prosecuting what his judgment approved, regardless of defeats or discouragements, were only equalled by his devotion to his friends. As directors we lament the death of one whose mind and integrity peculiarly fitted him to be the manager and custodian of great interests. Years of association and intimacy deepened our respect and increased our friendship for him, and each of us in his own way was bound to him by a thousand tender ties.

Mrs. Schell and the family have in this sad bereavement our profoundest sympathy.

"Resolved, That a copy of this record be sent to Mrs. Schell."

E. D. WORSTER, Secretary.

SEVEN cardinal virtues should be found in a pen. It must be elastic, well tempered, durable, even-pointed, easy writing, well shaped and neatly finished. Esterbrook's have all these qualities in perfection.

THE Burton Stock Car Co., of Boston, have just shipped two of their cars to Sydney, N. S. W., for the Australian government.

AT the first meeting of the Board of Directors of the consolidated company known as the Chicago, St. Louis and Pittsburgh Railroad Company, held in Philadelphia, on April 3, 1884, the following officers were elected: G. B. Roberts, president; J. N. McCullough, first vice-president; William Thaw, second vice-president; Thomas D. Messler, third vice-president and comptroller; John W. Renner, assistant comptroller; J. T. Brooks, general counsel; J. J. Brooks, assistant counsel; John E. Davidson, treasurer; M. C. Spencer, assistant treasurer; S. B. Liggett, secretary; A. A. Stull, assistant secretary; James McCrea, manager; John F. Miller, superintendent eastern division; Charles Watts, superintendent western division; M. J. Becker, chief engineer; E. B. Wall, superintendent of motive power; S. H. Church, superintendent of transportation; William Mullins, purchasing agent; Albert McElevey, auditor; John C. Snee, paymaster; William Stewart, general freight agent; F. H. Kingsbury, assistant general freight agent; D. T. McCabe, general western and division freight agent; E. A. Ford, general passenger and ticket agent; Charles O. Scull, chief assistant general passenger agent.

THE actual gross earnings of the Denver and Rio Grande Railway and its leased lines for February, were $391,780.54, and the operating expenses $357,212.16, leaving net earnings of $34,568.38. The loss on operating the Denver and Rio Grande Western Railway, being shut out of Silverton and Durango by snow slides, and the Colorado Coal and Iron troubles, largely reduced net earnings for the month. The business is still to be done, and will show in later months. April, so far, is ahead of same time last year.

THE Atchison, Topeka and Santa Fé Railroad Company officially announced on March 1, that Judge George W. McCrary has beeen appointed to the office of general counsel. A. A. Robinson, the general superintendent, is promoted to be general manager, and G. B. Harris is appointed assistant general manager.

R. M. PATTERSON, superintendent of the Rochester Division of the New York and Philadelphia Railway, has resigned. The Rochester Division and the narrow gauge system of connections have been consolidated, and J. W. Watson has been appointed superintendent, with headquarters at Olean.

ON April 1, John Dougherty was appointed treasurer of the Buffalo, New York and Philadelphia Railroad Co., vice F. S. Buell, resigned. On same date F. S. Buell was appointed cashier of the company, with office at 43 Exchange street, Buffalo.

THE Delaware, Lackawanna and Western Railroad has recently made the following appointments: B. A. Hegeman, traffic manager; William S. Sloan, general freight agent; W. F. Holwill, general passenger agent.

HOWARD E. LAING, formerly general agent of the passenger department of the Wabash Railway, has been appointed special agent of the passenger department of the Chicago and Alton Railway.

The other officers and employés of the Chicago, St. Louis and Pittsburgh Railroad Company, of Indiana, were continued in their respective positions until further orders.

ROSWELL MILLER has been appointed assistant general manager of the Chicago, Milwaukee and St. Paul Railway.

RAILROAD MEDICAL SERVICE.

BY S. S. HERRICK, M. D.,
SECRETARY BOARD OF HEALTH, STATE OF LOUISIANA.

BRITISH INDIA.

THROUGH the courtesy of the United States Consul-General at Calcutta, Hon. H. Mattson, I have been furnished with some particulars from the office of the Director-General of Indian Railways, relative to their medical service. It appears that these railways are owned, or at least controlled, by the government, inasmuch as they all have surgeons, most of whom are supplied from the Indian service, each drawing the pay of his class and grade. When practicable, the services of local government surgeons are made available, and they sometimes receive extra remuneration, besides pay of their grade. Large lines have special surgeons, assisted by apothecaries, assigned to the medical service.

Employés receive medical attention in ordinary sickness as well as in case of accidental injury; and no exception is made when the illness grows out of indulgence in vice. Under special arrangements, the families of employés also receive medical attention, but particulars touching the conditions and mode of administration have not been furnished.

Employés are not required to contribute to the maintenance of this service, by deduction from their wages or otherwise.

Where convenient, local hospitals are made available for this railway medical service; and in some instances special hospitals have been provided by the railway authorities.

There is no provision of instruments and surgical appliances, to be kept at stations or carried on trains.

All classes of employés are subjected to physical examination, previous to engagement, the examination being adapted to the kind of duty required.

The personal hygiene of employés and the sanitary condition of railway carriages, buildings, grounds, etc., are under supervision of the medical staff.

The families of employés, in case of injury, sickness or death, sometimes receive relief from the government in the shape of gratuities. Further relief may be obtained from provident asssociations, sustained by the voluntary contributions of members.

It does not appear that there are any general regulations relative to transportation of live stock, to prevent over-crowding, deprivation of food and water, too long confinement, or admission of diseased animals; but "precautions are taken in special cases."

AUSTRALIA.

My information respecting the medical service of the railways in the colony of Victoria has been obtained through the kindness of our Consul-General at Melbourne, Hon. O. M. Spencer, who put himself in communication with the Secretary of the Railway Department of the government, Hon. P. R. Labertouche.

This officer states: "Formerly such service was performed by the chief medical officer of the Victorian government. About two years ago this course was abandoned, and tenders were invited from duly qualified practitioners for this service, and the tender accepted provided for the examination of candidates for permanent employment in the railway department before appointment, for which they pay a fee of half a guinea. This examination comprises the physical development of the candidate, his general state of health, and a special examination to discover color-blindness. Besides these services, the medical officer examines employés whose state of health may be considered to unfit them to perform their ordinary duties. In such cases the fee is £1 1*s*, which is paid by the department, if the examination is at its instance, and by the employé, if at his.

"A special allowance of £60 per annum is made to another medical man for attending, in case of accident, to the men employed in the locomotive workshops of the department, who number about 700."

Neither employés nor their families receive medical attendance in ordinary sickness; but in case of injury sustained while in the discharge of duty, employés are allowed half pay while disabled. An employé is also entitled to a retiring allowance, which in case of death is paid to his family.

No special railroad hospitals have been established. Civil hospitals admit railway employés under their general regulations, without any special arrangement.

All classes of employés are subjected to physical examination, according to the kind of duty they perform, before engagement.

There is no sanitary supervision of employés or of railroad carriages, buildings, grounds, etc. As no railroad route is more than 200 miles in length, it is not thought necessary to establish any regulations for the transportation of live stock.

I have been supplied with a copy of the Rules of the Victorian Railways Annual Mutual Benefit Society, which was established in 1866, and in which membership is voluntary. No one is admitted who is in bad health, or in any way unfit for duty at the time of application, or who is over 45 years of age. Contributions are at the rate of 2s. 6d. per month. The entrance fee is 7s. 6d. to those under 40 years of age, and £1 to those older. Additional levies may be made to meet deficiencies. Neglect to pay dues for three months involves suspension or deprivation of benefits, at the discretion of the committee; and when the arrears amount to 15s., the member is finally dropped.

No member is entitled to sick allowance or funeral benefits until after six months' membership; but he may reclaim his contributions on leaving the department before that period has elapsed. Every application for relief must be accompanied by a medical certificate attesting to the sickness. In case of death, a certificate to that effect must be furnished. A member who has become sick, lame, blind or infirm, and thereby incapable of following his usual occupation, provided the disability be not due to drunkenness or other vice, and after approval by the committee, is entitled to 20s. per week for the first twenty-six weeks, 15s. for the next twenty-six weeks, and 10s. per week thereafter. But no member can receive more than twenty-six weeks' full benefit the same year, and must have an interval of six months before he can claim allowance for a fresh case of sickness.

On the death of a member in good standing, his next of kin or his representative is entitled to an allowance of £20. On the death of a member's wife, the husband is entitled to £10. A member's widow may continue a member of the society while unmarried, provided she sus-

tain a good character, and complies in all respects with the regulations. On her death, the sum of £10 is allowed to her legal representatives.

In 1878 additional regulations were adopted for the benefit of aged and infirm members, and also those disabled by accident or by a permanent disease. Members retiring from service above the age of 60 years, or physically disabled in the line of duty, are placed on this list, and are entitled to an allowance of 5s. per week after membership not less than five years, or 8s. after 10 years' membership, or 12s. after 15 years' membership; and 6d. per week for every additional year of membership above the periods stated. At the same time their contributions cease.

The United States Consul at Sydney, New South Wales, Charles Kahlo, Esq., has kindly furnished me with information relative to the medical service on the railways in that colony, which he obtained from the Railway Branch of the Department of Public Works, through its secretary, D. Vernon, Esq.

The government railways of the colony have a medical board of three members, two of whom reside at Sydney and the other at Newcastle or Maitland, who are paid regular salaries, besides fees for certain services. The duties of the board are: to examine applicants for employment with reference to their general health, and especially their eyesight for long distances and perception of colors, and their perfection of hearing; to examine employés who apply for sick leave, and those individuals who have received injuries from railway accidents; to attend such sufferers from accidents as may be indicated by the Commissioner of Railways; and also to prepare such reports, certificates, etc., as may be required. The services of local medical practitioners are occasionally called in requisition in case of emergency.

Apart from injuries sustained in discharge of duty, employés receive no medical attention from the railway authorities. Arrangemements, however, have been made for medical chests, suitably supplied with drugs, instruments, etc., to be carried on all passenger trains, and to be kept at the principal stations. Printed directions have also been issued to the men for treatment of injuries, in the shape of a neat leather-bound pocket-book.

Some attention is paid to the personal hygiene of employés and the sanitary condition of railway carriages, buildings, grounds, etc., probably by the medical board.

Provision is made by the railway department for employés killed or injured, but particulars have not been furnished.

Owners of live stock are presumed, in their own interest, not to overload the cars provided for their use. Australian cattle are said to be so wild that they will neither eat nor drink while *en route*.

The printed Rules of the Railway Traffic Branch Sick and Accident Society, established in 1871, are very similar to those of the society mentioned above, as existing among the employés of the Victorian railways. No provision is made in the latter for a retiring allowance to those disabled by age or infirmities.

This concludes what I have to say of the railroad medical service existing in foreign countries. Some materials have been gathered relative to the railroads of the United States, which may take like shape in future issues of this JOURNAL.

Permanent Way for High Velocities.

BY WM. S. HUNTINGTON.

THE American people are difficult to please. When they are satisfied that their desires in any particular direction have been gratified as far as lies within the range of possibilities, they are comparatively contented and happy; but if they have a suspicion that they have not reached the full extent of what is possible for them to enjoy, they are at once uneasy and fretful. Thus, when railroading was in its infancy and cars were drawn by horses of flesh and blood, ten miles an hour was satisfactory in the main, but when fifteen miles was "done" in an hour, there was nothing further to be desired. So far as travel was concerned, we had reached beyond all expectations, and we were happy and contented because we did not believe it possible to increase that rate of speed. Everything was serene until the "iron horse" was trotted out and made twenty miles an hour. Then twenty-five, and finally thirty miles an hour was done! But the American people were no longer satisfied. Fifteen miles an hour was highly satisfactory in the start, but when that speed had been doubled and in many instances more than doubled, the cry was, still faster, and we now complain that sixty miles is too short a distance on which to waste an hour. The public understand that we have not yet reached the utmost limit of possibilities as regards the speed of railroad trains, and they are restless under the restraint which is brought upon them while waiting a short time for that development or improvement of permanent way and motive power which is necessary for running trains at the velocities now demanded by a fast people in a fast age.

More than ten years ago the writer of this article made the statement that it was his belief that the locomotive of that period was substantially the same as would be in use many years hence; that no startling change would be made in the form and general construction of the machine, but that minor improvements would be added to it from time to time, and would keep pace with the growing demands for higher speed. And it was confidently predicted that any speed an exacting public might demand up to 100 miles an hour, would be accomplished at no distant day. This prediction—which was thought by many to be rather wild—was based on the fact that at that time there was a marked improvement in track and locomotives; and the performances of the latter on some of our best tracks pointed to 100 miles an hour as among the possibilities, if such a velocity were required.

When we set our stake at 100 miles an hour it did seem a great way off, but we are nearing it at a lively pace. When the mark was made, forty-five miles an hour was considered lively work, and that was reached only on extra occasions. We have gradually neared the 100 mile post, until we have (on an extra occasion) made ninety-one miles in sixty minutes. We expect within the next ten years to add the other nine miles to our present record, which should be sufficient to satisfy the fastest American alive. And we shall do it with the *American locomotive*. No *monstrosity* need apply.

But this article has little to do with locomotives, further than to say that in reaching the 100 mile post the locomotive men are gaining on those who prepare the way for fast travel. When we get our tracks as near perfection as

our best locomotives have reached, the most *unreasonably fast portion* of our people can be handled at the speed of 100 miles an hour, if they will pay for it.

As there seems to be an increasing demand for fast trains, it behooves all who have charge of construction and repairs of track to "look alive," as our English cousins say, and get prepared for any speed that may be called for up to 100 miles an hour. Beyond this we shall not go.

The first thing to be done in the premises is to cut down the hills and fill up the hollows and prepare a road bed, and grade with special reference to fast work. This done, it remains to build a superstructure capable of withstanding the rough usage it would be subjected to under heavy trains at high velocities. This would require an abundance of heavy cross-ties, supported by a liberal quantity of good ballast, and the latter should be so applied as to support the ties laterally as well as vertically. One of the principal causes of "bad track" on American railroads, is the lack of ballast at and outside the ends of the ties. Without sufficient ties and ballast the track is very unstable, and although it might behave satisfactorily under light traffic and low rates of speed, it is entirely unfit for fast or heavy work. It may be kept in tolerable surface with a great deal of care and labor, but ballast is cheaper and safer than labor. Some years ago engineers sought to strengthen rails vertically by increasing their height without any addition to their weight. In this change of pattern they were successful to a certain extent; but while they improved the rail in one direction they injured it in another, and although the rail of new pattern was capable of sustaining a greater weight, it could not withstand lateral strains, and soon become full of kinks under the rough treatment of the "moguls." In designing a rail for heavy trains and high velocities, lateral stiffness should be kept in view as well as vertical strength. Width of base is also of greater importance than has usually been attached to this matter. By increasing the width of base the rail is strengthened laterally, is less destructive to ties, and will the better resist end thrusts of axles, and tendency to roll outward from lateral pressure. The coming rail will undoubtedly have a very broad base.

It is not expected that the speed we are looking for will be made on curves of very short radius, although curves are less dangerous with fast trains than is generally supposed. A train is less liable to derailment on curves in good condition than on tangents, and if it were not for the greater liability of collisions and encountering land slides, rocks and other obstructions, and all that class of accidents resulting from an obstructed vision, curves would be the safest parts of the road. But for fast work *compound curves* are bad. When a locomotive enters a curve with uniform radius and elevation it moves with a steady, *graceful* and gliding motion that is altogether pleasing, but getting quickly around a compound curve is decidedly awkward, and more than a trifle dangerous. Locomotives weighing fifty or sixty tons are being prepared to do the fast work of the near future, and it is unsafe to trifle with their centrifugal force by "breaking it up" on compound curves. Better not have such curves.

The frequent accidents from spreading of rails with our comparatively low rates of speed, would indicate that in preparing for quick trains some effective measures must be adopted to prevent this displacement of rails, which will become more frequent with heavier trains and higher velocities unless some specific remedy is employed. It is evident that the ordinary spikes are inadequate alone, and rail braces must be brought to their assistance to prevent this most needless class of accidents. For the coming heavy and fast trains, straight lines as well as curves must be braced to prevent the spreading of rails, and if this and other details mentioned herein are properly attended to, we can increase our speed and at the same time diminish the number of unexplained derailments. Bridges need a liberal share of the attention that must be given to the preparation of permanent way, in order to render them equal to what will be expected of them. The most disastrous failures of these structures of late, have resulted from the reluctance of ambitious engineers to disfigure their graceful spider-web specimens of engineering skill with lateral stays, on very high and very narrow bridges. And it will be necessary to look up the best safety switch in existence and use it; likewise the best system of signals. Brakes are daily becoming of greater importance than heretofore, and prejudice or lucre should not stand in the way of getting the best. The task of putting tracks in a condition to carry trains at the speed indicated is not a difficult one, but those who have the work in hand will do well not to lose sight of the foregoing brief hints.

To Make Trucks Square Economically.

In a speech at the last convention of the Master Car-Builders' Association, W. R. Davenport, Erie Car Works, said: "I knew of an instance of a train which came in and reported four hours late. The train was of moderate size, and the conductor said he did not know what the matter was, but the train pulled very hard. The connecting rod had the same difficulty until they cut out the first lot of five cars without doing any good, but when they cut out the second five cars there was no longer any difficulty in pulling. Evidently the second time they cut out the car that gave the trouble. We set about devising a plan to make trucks square economically. We first saw that everything was perfectly square. We drilled taper holes and fitted taper steel pins to the holes, and had castings prepared that would fit the curvative and flange of the wheel, so as to hold the wheel firmly in exactly the same position; rolling in the first pair of wheels and setting them up against these castings, rolling in the second pair and bringing them up and matching the flanges of the first pair, so that they occupied precisely the same position on the rail, and setting up a second pair of castings corresponding to the first. We had the two pairs of wheels set in the same position to each other on the rail, squared up and wedged there securely. We found the men were able to set up the trucks very rapidly. They really made a gain in the construction of trucks fully equal to the time required in adjusting the wheels on the track. The result has been very satisfactory. All practical car builders who have seen it are pleased with it, and say they wonder they did not think of it before. It is a very simple thing. There is no patent on it. Anybody can use it, and I think it will be found to be very beneficial in the construciton of trucks.

A RETROSPECT:

BEING

Complete History of Railroad Progress in America.

Compiled from this Journal, beginning Fifty-two years ago.

CHAPTER IV.

THE HARLEM RAILROAD "LOCATED"—DIRECTORS OF THE PROVIDENCE AND BOSTON RAILROAD COMPANY, FOR 1832—RAILROAD PROPOSED IN 1831, TO BEGIN AT CHICAGO—VIRGINIA'S ATTITUDE TOWARDS RAILROADS IN 1831, AND PROPOSED IMPROVEMENT OF THE JAMES RIVER.

ON January 14, 1832, the JOURNAL reported the "location" of the Harlaem Railroad, which had been laid out by the corporation of the city of New York. The road was to begin at Twenty-third street, "and pass through the center of the 4th, or Broadway avenue, to Harlaem River, at a point about 300 yards above the bridge." The length of the route selected was five miles. Operations were to begin by the first day of the next month, the date when all contracts were appointed to be made. "It is intended," says the writer to whom we are indebted for these facts, "that this road shall be constructed in the most permanent manner, with double track, and the cost to be about $50,000 per mile. Application will be made to the Legislature at its present session, for permission to continue the railroad down to Fourteenth street, and to such other part of the city as the Corporation may permit. There is little doubt but this will prove a profitable investment to the stockholders, even if no other use should be made of it than for passengers." The concluding sentence of the article embodying so much entertaining local history, is especially noteworthy: "It is however so located as to meet the road now in contemplation from Albany to New York, on the east side of the Hudson River."

On the eleventh of January, 1832, the following gentlemen were chosen directors of the Providence and Boston Railroad Company, at a meeting held in Boston: Wm. W. Woolsey, of New York; Thos. B. Wales, J. W. Revvu, P. T. Jackson, and J. F. Loring, of Boston.

The shrinking modesty of Chicagoans will receive no shock from the fact that their now world-famed city had early mention in the history of the American railroad system. In the *Illinois Intelligencer*, of December 24, 1831, appeared a communication from J. M. Bucklin, engineer of the Michigan and Illinois Canal, addressed from Springfield, November 21, 1831, to Charles Dunn, acting commissioner of said canal. Mr. Bucklin says: "Having (in conformity with your instructions) finished the examination of the Calimic river, together with a series of surveys in the valleys of the Des Plaines and Illinois rivers, necessary to the development of their true character, with reference to the projected improvement of the communication between Lake Michigan and the navigable waters of the Illinois river, by means of a canal or railway—a detailed report of the result, including the maps and profiles of the different lines surveyed, will be furnished the Board as soon as practicable. The objects of the examination of the Calimic river were in a great measure attained. But with every facility afforded for the supply of the summit level with water, at the most favorable elevation, the facts elicited by the examination of the route of the proposed canal, are unfavorable to the practicability of its safe and economical construction. The route examined for a railway commencing at Chicago, crossing the Des Plaines at Laughton's ford, and pursuing the N. W. bank of the Des Plaines, was found extremely favorable for the adoption of that species of improvement. The ascent from Chicago to the summit level, is twenty-five feet, and the descent from thence to the foot of the Rapids of the Illinois, 170 feet; which can be readily overcome by locomotive power, without the aid of stationary engines, at a rate of graduation rarely attaining, and seldom exceeding, twenty feet to a mile. Materials of stone and timber are generally found in the immediate vicinity of the line." Thus the surpassing eligibility of Chicago as a railroad station was early ascertained and officially reported by an expert in surveying.

A little good-natured banter at the expense of the State of Virginia, shows what a sprightly man the first editor of the AMERICAN RAILROAD JOURNAL was. "The Old Dominion," he says, "has strong predilections for old ways. To such an extent, indeed, does it carry this predilection, that it is almost proverbial for bad roads; which, because they were good enough for the fathers, are now thought good enough for the sons; and, for being somewhat behindhand in the improvements which other states have accomplished or are rushing into. The improvement, however, above Richmond, of the James River—a main artery of Virginia—is now seriously contemplated, and, according to extracts we find in the Richmond *Whig* from the Chief Engineer's report, it is by a railroad that this improvement is to be effected." The report of Captain Crozet, the chief engineer referred to, is an exceedingly interesting document. It seems that the estimated amount of the capability of the commerce of the James River, between Richmond and Lynchburg, at the date December 26, 1831, was: $54,887, canal; $168,020.40, locks and dams; and $78,892, railroad. "These receipts," writes Captain Crozet, "are the surplus to be deposited in the Treasury free from all the annual charges of the improvement of the section up to Lynchburg." Having reviewed the three modes of improvement feasible between Richmond and Lynchburg, namely, locks and dams, a canal, and a railroad, he proceeds to give unhesitatingly his preference for the last-named, and backs it with substantial reasons. The mere question of economy, he admits, would determine the choice in favor of a lock and dam improvement; "but if it is wished to adopt, at once, that style of improvement best adapted to secure to Virginia the great and extensive advantages she can command by her geographical situation, a railroad is undoubtedly the system I should prefer. This opinion," he continues, "to which I have inclined for some time, has been fortified in my mind by the operations of the past seasons, which have proved the connection with the West to be most remarkably practicable; and if Virginia is prepared to expend three millions of dollars upon an improvement up to the mountains, it is certainly not to a canal I should wish to see them applied." He founds his

preference for a railroad upon the consideration of its cost, which "(double track) would not exceed $20,000 a mile, as is now fully established by the experience of the Baltimore and Ohio Railroad;" upon the increased travel which would result from its construction; and its (the railroad's) providing uniformity in the mode of transportation. This last, he regards as "the principal and most decisive consideration," because "it saves the expense and other inconveniences of translation everywhere, and in this particular instance may save the whole trade; for, if now the trade of Tennessee goes to Baltimore, over the worst of roads, how much more readily would it take that course, if a railroad from Tennessee or Kanawha, to James River, was met there by one coming along the valley of the Shenandoah?" A tidbit of rhetoric follows, which the compiler cannot resist the temptation to quote: "Let us picture to ourselves a train coming rapidly down to James River, across which is a railroad viaduct; on this an elegant locomotive engine is in waiting, which, in one day will carry the whole train to Baltimore, without delay, without unloading; on the other side are negroes, resting on their poles, inviting the produce to the safe conveyance of their boat under lock and key, down to Richmond, at the rate of two and a half miles an hour, that is in thirty hours! (seven average days!) from Pattonsburgh—the power, said negroes themselves, or some harness and whip-striped mules. Which of these, I ask, will tempt the trade? I answer, the locomotive engine, which will be in Baltimore long before a transfer could be made into the boats, and at a less cost. "Captain Crozet's report contains convincing arguments in support of his position, derived from the capability of the locomotive as demonstrated up to the time in which his entertaining document was prepared. "The Sampson," he observes, "has drawn 150 tons at an average rate of twelve miles an hour, the coke burned not being quite one-third of a pound per ton per mile. While the moving power has received these beautiful improvements, the means of diminishing the resistance have not been neglected. A few years ago, Tredgold estimated the friction at one in 130; N. Wood ventured as far as one in 200. Now, the Winans car enables one pound to draw 450, with small wheels; and that, with outside bearings and chilled boxes, common cars will probably be made with enlarged wheels to be drawn by one pound out of 400, and perhaps more." The report concludes with a couple of sentences which show that Captain C. Crozet had gained that mastery of language which it seems, then distinguished his own city of Richmond more than its zeal for mechanical improvements, and the employment of which would certainly find favor in the Virginian Capital, in the year of grace 1831, on the day after Christmas. "The railroad system is the triumph of the age—the ultimate effects of its introduction are incalculable, and with the certainty that it will produce important changes in the commercial and even political world, its early adoption is safer than its rejection in favor of another system, from which no further developments are to be expected. Such are my opinions and such their motives."

(To be continued.)

THE Railway Car Accountant's Association hold their annual convention at Richmond, Va., on May 20th.

News from United States Consuls.

CONSUL ALBERT D. SHAW, Manchester, England, writes: "There is no mystery about the processes by which English supremacy (in foreign trade) has been obtained. The course they adopted is open to us, and the results they have achieved we can expect to realize, in part at least, when we are as wise, as courageous, and as enterprising as English statesmen and merchants have been, in extending their trade relations among the distant nations of the earth."

LYELL T. ADAMS, Geneva, says: "Any account of the commercial position of Switzerland to-day would be incomplete without some reference to the great changes impending on the completion of the new lines of international communication whose effect will be to make her a commercial, as she already is the geographical and hydrographical, center of the continent. Nothing has isolated her hitherto but the altitude above the sea-level, now overcome by the Brenner Railway and the tunnels of the Mont Cenis, the St. Gothard, and the Arlberg, just opened. By these routes the extremities of Europe are brought into direct relations, the meeting point of all lying upon Swiss territory with the exception of the Mont Cenis. This line crosses Upper Savoy, which by the treaty of 1815 forms part of the Swiss neutral territory to be occupied in war by the armies of the Confederation. One of its main feeders is the West Swiss Railway, from Berne to Geneva, and much of its traffic is likely to be diverted by the projected tunnel under the Simplon. What effect this reconstruction of the European railway system will have on the fortunes of Switzerland it is too early to conjecture."

OUR consul at Vienna, James Wiley Weaver, reports: "Should nothing unforeseen occur to delay the completion of the Arlberg tunnel, it should be opened for traffic in a twelvemonth, to the end that instead of the five years specified in the contract the time would not exceed at most three and a half years from the commencement. The time required to complete Mont Cenis tunnel was fourteen and a half years, and that required for the completion of the St. Gothard tunnel was nine and a quarter years. The Arlberg tunnel when finished will form a very important link in the railway system of Austria. When the tunnel is completed, it is said that the passage will require one and a quarter hours for the ordinary and three-quarters of an hour for the express trains. The new railroad, of which the Arlberg tunnel forms the most important and expensive part, runs from Innsbruck up the right bank of the river Inn to Landeck, a distance of forty-five miles. Here crossing the Inn it ascends the Paznauner and Stanzer valleys to St. Anton, where the eastern terminus begins. The tunnel at this point passes through the Arlberg, a spur of Rhætian Alps, which forms the watershed between the Danube and the Rhine. After passing through the Arl Mountain by a tunnel of 10,270 meters in length, the road continues from Langen down through the valley of the Kloster River and over a mountainous region to Bludenz, which already possesses railway communications with Lake Constance and the east of Switzerland. The distance from Landeck to Bludenz is forty miles, making the total length of the Innsbruck Bludenz line about eighty-five English miles.

O. M. SPENCER, Melbourne, reports the number of miles of railway open and in course of construction in Australasia, on December 31, 1882, as follows: 6,209 miles open, and 1,566 miles in construction. From the report of the commissioner of railways it appears that up to December 31, 1882, the colony of Victoria had expended £19,746,915 in the construction of her 1,355 miles of railway, or an average of £14,573 per mile. The gross earnings for 1882 amounted to £1,781,599, an increase of £115,869 over 1881. After paying £1,098,599 for working expenses, there remained a balance of £682,479, being a net profit of 3½ per cent. on the total cost of construction. This low rate of profit is due, for the most part, to the heavy damages which the government has been compelled to pay on account of several serious railway accidents. The commissioner of railways for New South Wales reported that during the year 1882 the earnings of the railways were £1,698,863, and the working expenditure £934,635. The lines open for traffic yielded 5.14 per cent. on the capital invested. The total expenditure for construction of all the railways in New South Wales amounts to £16,776,642.

IN their *Magazine of Art*, the publishers, Cassell & Company, Nos. 739 and 741 Broadway, New York, issue a monthly which leads the popular periodicals of its class. What it has to say about artists and their work, while free from the unintelligible twaddle which is sometimes made to do duty as art criticism, is well-informed and judicious, as well as clear and readily understood by persons of ordinary culture. The range of subjects treated is wide, as appears from a view of the contents of the April number. A picture from Sandro Botticelli, "Smeralda di Bandinelli" is the frontispiece. Illustrated articles succeeding are "More About Algiers," by J. Arthur Blaikie;" "Battle and Travel," by Professor Nicholas Sobko; "Art in the Garden," by Barclay Day; "Burdlus;" "Northwest Passage," by Robert Louis Stevenson; "Pictures of Japan;" "Pens and Pencils: Wordsworth and Sir George Beaumont," by J. Ashcroft Noble;" "The Constantine Ionides Collection," by Cosmo Monkhouse; "The Country of Millet," by Hugh de T. Slazebrook; "The Chronicle of Art," and American Art Notes." "The Bravo," by Enrique Serra, is a full-page drawing, cleverly brought out by the printer. The letter press and pictures of the *Magazine of Art* are correspondent and agreeable to the nature of its contents.

"THE Tabor Steam Engine Indicator," by George H. Barrus, S. B., member of the American Society of Mechanical Engineers, is a publication of the Ashcroft Manufacturing Company, New York. Mr. Barrus wrote his work, not as an advertisement of the instrument named in the title, but as a book of reference and instruction for purchasers and others interested in the subject. We unhesitatingly commend it to these two classes of persons, as a practical and valuable book, crowded with well-ascertained and well-arranged mechanical information.

RECEIPT of the Report of the Proceedings of the Seventeenth Annual Convention of the Master Car-Builders' Association, is hereby acknowledged. Being a record of the results of practical railroad experience it is a pamphlet of great value.

Communications.

A Suggestive Question.

Editor American Railroad Journal:

HAS the United States government, or that of either of the States, offered a prize for a satisfactory car-coupler? My coupler is the common link and pin coupling so contrived that the link is held in any required position for entering the draw-head of an approaching car, whether it is higher or lower. It will couple every time without the necessity of going between the cars; and can be coupled with any of the common apparatus, using the same link and pin. The draw-heads will not cost over one dollar each more than the common draw-head, and will fit into the same place without making any alteration on the car.

Any railroad company willing to give my coupler a trial, is invited to consider the following proposition: We will make from two to ten at the same price as the common draw-head, and if, after a sufficient trial, they don't give satisfaction, we won't ask any pay for them.

My coupling can be used with or without a bar for drawing the pin. The bar reaches across the car, and is turned back or forth for coupling or uncoupling without a man's going between the cars. Railroad men say they prefer the coupler without the bar. Four of my couplers are working on the Canada Pacific Railway, and giving satisfaction. There is no danger whatever associated with their use.

CHARLES DEVLIN.

PEMBROKE, Ontario, Can., March 25, 1884.

Editor American Railroad Journal:

IN reply to the pungent letter of "Pontifex," in your March issue, permit me to arrange a few old "saws" to help him and others be firm in the discharge of their political as well as of their scientific duties.

Everything in nature has its opposite: Heat, cold; hard, soft; worth, pride; purity, depravity; training, vanity; Christianity, paganism; religion, infidelity; and many other extremes without intermediates.

The difference between each two antipodal conditions is best accounted for by the terse and sapient language of the philosophy which enunciates, "heat is the absence of cold" and "cold is the absence of heat," a decision which proves by two reversible and interchangeable witnesses that "philosophy triumphs readily over past and future dilemmas, but succumbs to those of the present."

With Nature's laws immutable, and the Declaration of Independence as it stands, it is hard to solve by direct means the problem which the thoughtful mind of Pontifex propounds.

If he, with the thousands of others like him, will only take his fraction of "the bull by the horns," and settle the question of precedent with the local officials where the "market price" is too "stiff" to "see" them "one better," by doing, as the ninety pound student did, with his two hundred and fifty pound uncle, the bishop, he will aid the cause of truth; and, may be, if he has good fortune, he may elicit an expression of confidence tantamount to the admiration the Bishop felt when he called his nephew's lift, "a triumph of mind over matter."

The engineer must not expect to find the "lamp of science" among an "ass o! sigh a tion" of political place-holders within the purlieus of any great city. He may not find it within the walls.

The fault lies deep. It is in the school system, which cultivates the "jaw tackle" of the majority, to turn them out with the polish of brass on a lively memory at pubescent age, with the admonition that "the world owes them a living," to act out

"Let others seek for wisdom's way,
"In modern science, modern wit;
"I look t'intrigue for all that these,
"These two can teach is taught by it."

A few follow in the steps of their parents; a few make Christians—science is beneath them. The rest have a "call" to politics, religion or finance.

Some brush up and get an insight into the mysteries of "put" and "call," "long" and "shorts," "margins" and "corners," with a dash of "poker" by holding the edge of their wits on the grindstone of "finesse" and "chicane," during a few weeks seance in some "cheap John" college.

Pot-house politicians are not the only class which is prone to feel that one dollar's worth of private interest weighs more than thousands worth of good to the general public.

Such has been the combination of avarice with political sagacity heretofore, is now, and always will be to the end of time.

Wealth is not to be scorned by any means, but the worship of it is pernicious.

One man may acquire a dollar while another is earning a million. The dollar man may have secured a good margin on what he really earned. The other may throw his whole soul and mind into making his undertaking

the means of sustenance for thousands. The opposites for both cases are easily imagined.

Everybody knows it will not do to have all of any community from one kind of men. There must be an opposite for every force, or good morals will not obtain, good work cannot be done. We must have "rank and file with well trained wills and careful minds to make labor honorable." Then

"Though it be of warlike Hector
"Of a revenue collector; or,
"Though it be the lamest beggar,
"That e'er limped from door to door;
"They'll not ask him of his nation;
"They'll see the man and not his station."

Labor ranks everything.
It conquers everything.

Education sometimes fits a mind to know which horn of a dilemma to take hold of first, but, there is always another head which boasts of having "well corned" "horse sense," which can discount the trained head in promptitude of expression.

The trained man may be a worker; the other is a social or Bacchanalian loafer or gossip, who depends on the "supervisors'" peculations for his standing or creature comforts.

Engineers who love pure science for itself should take time to study human nature in all its nakedness. The purely selfish phase of it can best be understood in all its ramifications by feeding a herd of hungry store hogs. The "swine boss" does not wait till all the rest are through. He does not stand up in the trough, nor does he "sqush" out the contents by lying down in it. He gets his fill and then politely and benignly gives room for his mates. No human being can emulate the cool, imperturbable indifference of this hog to the rights of his associates, pending his satiety, or his mannerisms after he is satisfied.

We have got to take things as they are, and face the music as stoics, to vote against the gambling rings. Not only this, but the purity of the ballot box should not be left to the rabble element.

An engineer's life should be "real," "earnest," full of truth. His vote should be on the side of good order and good morals

If he loses heart while his profession is in its infancy, what will other honorable branches do?

Just as a well aimed bombshell will describe a graceful trajectory, and mayhap ricochet to right and left before it bursts in the heart of its objective, so "Socrates" made his "ten-strike" with a "time-fuze" in his liver after being fired from his own door by the diffusion of "useful intelligence." He made a transient triumph, but the "pins" survive him.

When Diogenes carried the candle his quest was fruitless. "Absolute right is unattainable."

PARADOX.

MARCH 31, 1884.

Editor American Railroad Journal:

I NOTICED in your March number, on page 504, a communication from M. Poisot, on the slipping of engine wheels. I would like to give you my own experience in the same line. In the year 1856, or as the almanacs say, the year before or the year after, I was living in the city of Cumberland, Maryland. The Baltimore and Ohio Road had quite recently been opened from that point to Wheeling, through the mountains, and there was another road running up through the mountains also, then called the Mount Savage Road. Both these roads in the winter were very much delayed in their operations by ice and snow.

My former business had led me to make some experiments in the quick removals of snow and ice from some parts of our works, and by experiments I found that nothing would do it so quickly as live steam, and that when it struck iron plates it made them almost as clean as if they had been scoured.

I communicated my ideas to some of the railroad officers, and requested the privilege of making experiments. This could very easily have been done, and with very little expense, by putting a pipe in the forward end of the boiler, branching off to either side, and so arranged that the steam would strike on the rails immediately in front of the wheels, the very same idea the Frenchman arrived at by accident, and it would have undoubtedly produced the same results. If my recollection is correct, I even went so far as to communicate with the *Scientific American* in regard to obtaining a patent, but the railroad men spoke so slightingly of the matter, not even allowing me to make the experiment at my own cost, that I was discouraged from going to the expense of taking out a patent. Every engine driver will tell you how much better his driving wheels will take hold on the rails after a heavy rain. I proposed to do artificially what they found an aid to them from natural causes.

I have no doubt it would do away in most instances with the use of sand, and thus be a great saving to both the rails and driving wheels.

The idea might be carried still farther and be found efficient in working through snow drifts. For going through moderate drifts the engine drawing the train could spare enough steam to cut them out, and where they were more formidable an old locomotive boiler mounted on wheels, with a tender and inspirators to keep up the supply of water, would work through a snow bank faster than any of the expensive machines lately gotten up for the same purpose.

Respectfully yours,

JNO. OLIPHANT.

WATSONTOWN, Pa., March 26, 1884.

Cleveland, Columbus, Cincinnati and Indianapolis Railway.

THE total length of road owned and operated by the Cleveland, Columbus, Cincinnati and Indianapolis Railway Company is 738½ miles.

Following is the board of directors' report of the operations of the company for the year ending December 31, 1883:

The gross earnings have been:

Received from freight		$3,068,717 09
Received from passengers		965,693 47
Received from mail		87,229 47
Received from express		91,466 54
Received from rents		58,810 80
Received from interest and dividends		70,686 64
Total earnings		$4,342,604 01

The expenses have been:

Total operating expenses, 69.50 per cent		$3,018,382 75
Taxes		125,144 32
Interest on bonds		507,453 31
Interest and exchange		26,889 94
Total expenses, taxes, interest, etc		$3,677,870 32
Net earnings		$ 664,733 69

In a comparison with the results of the year 1882, there is shown:

A decrease in gross earnings of	$98,996.55 or 02.23 per cent.
An increase in operating expenses of	$54,604.33 or 01.84 per cent.
A decrease in net earnings of	$153,600.88 or 10.39 per cent.
A decrease in tonnage of	227,874 tons or 08.27 per cent.
A decrease in tons one mile of	38,975,134 tons or 08.71 per cent.
A decrease in freight earnings of	$90,699.56 or 02.87 per cent.
A decrease in freight expenses of	$69,992.35 or 03.05 per cent.
A decrease in net freight earnings of	$20,707.21 or 02.40 per cent.
An increase in net freight earnings per ton mile of	.013 cents or 06.73 per cent.
A decrease in passengers carried of	59,296 or 05.72 per cent.
A decrease in local passengers carried	36,049 or 04.19 per cent.
A decrease in through passengers carried	23,247 or 13.29 per cent.
A decrease in passengers carried one mile of	1,211,365 or 02.71 per cent.
A decrease in passenger earnings of	$34,576.20 or 03.45 per cent.
An increase in passenger operating expenses of	$124,596.68 or 18.67 per cent.
A decrease in earnings per passenger per mile of	.018 cents or 00.81 per cent.
A decrease in earnings per local passenger per mile of	.091 cents or 03.49 per cent.
An increase in earnings per through passenger per mile of	.031 cents or 01.74 per cent.
An increase in cost per passenger per mile of	.328 cents or 22.00 per cent.

The amount of tonnage transported during 1883 and the revenue therefrom falls short of the results which should ordinarily be anticipated from a year's work of the railway.

Indeed, for the first half of the past year, or late into the summer, the tonnage and earnings of the line had steadily continued to increase, and in comparison had largely exceeded the figures of any like period in the road's history. But the measurable failure of staple crops subsequently told against the freight revenue, and apparently from the same cause the local passenger traffic was affected. A back-set further came in the autumn, when the railway stood firm in its maintenance of rates upon competitive traffic, bound thereto by the firm policy of its eastern connecting roads, and in consequence saw business surrendered for a considerable time through a one-sided observance of tariffs. The outcome of this disagreement in rates was attended with less general demoralization than might have been expected, and the year closed with the results of the last six months very unsatisfactory. Yet the universal observance of agreed tariff rates, which

throughout the first seven months of the year had obtained almost without exception, did somewhat offset this later loss of traffic from rate-cutting, although in the end the result of such cutting was a disregard of tariff by all roads.

It was from the effects of the seven months accord and good faith between the roads, that the average gross freight rate per ton mile for the year exceeds that of 1882, and is shown to be 0.751 cents, as against 0.706 cents in 1882. The cost freight rate per ton mile for the year is 0.545 cents as against 0.513 cents in 1882.

The tons moved one mile in the year were 408,436,350, as against 447,411,484 in 1882, being a decrease of 38,975,-134 tons moved one mile, or 8.71 per cent.

The increased cost of passenger operating expenses is wholly due to rebuilding and advancing to standard the passenger equipment of the line, which work has been substantially completed.

The last annual report set forth the acquirement on the part of this company of the entire interest in the Indianapolis and St. Louis Railway and of its leased line, the St. Louis, Alton and Terre Haute Railroad.

On the sixth day of June last, the stockholders of the Cleveland, Columbus, Cincinnati and Indianapolis Railway Company ratified the modified lease, duly executed by the Indianapolis and St. Louis Railway Company as lessee, and the St. Louis, Alton and Terre Haute Railroad Company as lessor, of the railroad of said lessor, extending from the city of East St. Louis in Illinois to the city of Terre Haute in Indiana, with a branch to the city of Alton in Illinois, for the term of ninety-nine years from the first day of November, 1882. The total number of shares voting were 125,873, and all were cast in affirmation of said lease.

With the determined policy of this company to absolutely control and operate, as a single interest, this road with the other roads in question between Cleveland and St. Louis, including in such management the lines to Cincinnati, there followed the necessity of putting into good and efficient physical condition the St. Louis, Alton and Terre Haute Railroad and also completing the rebuilding and restoration of the line between Terre Haute and Indianapolis.

It was determined that this reconstruction work, great as it was, should be vigorously pushed to completion, having regard to the best interests of all the properties, and to this cause the extraordinary expenditures of the past year are due.

It may be said that the St. Louis, Alton and Terre Haute Railroad has been largely renewed in its track and bridge superstructure, and extensive additions have been made to its sidings and buildings.

Much of the work done, as well as that upon the line of the Indianapolis and St. Louis Railway, is comparatively permanent, and the future requirements of this character of expenditures will be limited.

The outlay was necessitated not only to obtain safety and efficiency in the current working of these roads between Indianapolis and St. Louis, and to secure economical results in their cost of operating, but, with the possession of increased facilities and capacity, to be enabled to command an augmented traffic, the practical effect of which should make the Indianapolis and St. Louis with its leased road not only self-sustaining in themselves, but profitable in their respective outcome.

There has been advanced during the year to the Indianapolis and St. Louis Railway and to the receiver of the Indianapolis and St. Louis Railroad to provide for the outlays just described in carrying forward the plan of this company, a total sum of $1,109,797.88.

There has been advanced to the Cincinnati and Springfield Railway during the year, as follows:

Purchase of land at Cincinnati	$ 81,739 92
Middletown branch	1,250 00
New side-track	5,291 10
Total additions	$ 88,281 02
Deficit in operating, 1883	174,947 78
Making the total sum advanced	$263,228 80

The above charge on account of property addition, is the third and final payment under original contract for station ground in the city of Cincinnati. No further obligation of this character attends the Cincinnati and Springfield Railroad, which has now been mainly relaid with standard pattern steel rails (heavier than the original rails), and whose original wooden bridges have now been entirely replaced with ample iron structures, whilst the road's capacity for service has been largely increased.

It is believed, from the present outlook, that this portion of the C. C. C. and I. property is in a condition, under ordinary circumstances, to be operated with more satisfactory results.

The following expenditures during the year have been made upon the main line on account of additions:

For new equipment:

Additional freight cars	$198,580 65	
Additional locomotives	138,558 78	
Additional passenger cars	15,865 60	
Additional baggage cars	2,080 69	
Total expenditures for new equipment		$355,085 72
New side-track		25,357 65

For lands:

Station ground at Linndale	$1,212 50	
Station grounds at Franklin	1,000 00	
Station grounds at Milford	55 00	
Total expenditures for station grounds		2,267 50
Total expenditures, main line, account additions		$382,710 87

The bonded debt of the company has been increased $930,000.00 during the year, and now stands at $7,295,000.00. The reason for such increase is shown as follows:

In providing for the outlays attending the reorganization of the Indianapolis and St. Louis Railroad, and the renewal and reconstruction expenditures connected with the lines between Indianapolis and St. Louis, it was the decision of your board not to attempt to dispose of bonds or other form of obligation based upon the credit of the Indianapolis and St. Louis Railway Company, but to assume directly on the part of the Cleveland, Columbus, Cincinnati and Indianapolis Railway Company, the carriage of these particular charges. Hence, during the year, sale was made of 998 of the consolidated mortgage bonds, and the current earnings of the main line were also used in part on account of the extraordinary expenditures just alluded to.

The further action of your board has been to order the preparation of a new general mortgage of the Cleveland, Columbus, Cincinnati and Indianapolis Railway, in amount twelve million dollars, to include and ultimately retire all of the outstanding mortgages, and thus yielding about four and one-half million dollars of bonds, as a provision

for the present and future requirements of the railway in its development and additions to its estate.

The mortgage has been completed, and a very limited portion of the bonds secured by it will now be offered for sale, with a view to partly recoup the treasury.

The earnest desire of the board has been for the railway to reach the position where and when under ordinary circumstances at least, the earning and regular payment of dividends could be relied on. Such a position seems more assured to-day, with these properties under one management, and of one interest, connecting the gateways of St. Louis and Cincinnati respectively with the city of Cleveland, and with the solidified railroads now working in the fullest accord as a part and portion of a trunk line system between the Atlantic seaboard and the Mississippi Valley.

The roads in their physical condition mile for mile will compare favorably with the best, and the equipment has been thoroughly maintained.

For the extraordinary amount of work successfully accomplished, and for the results of the year, much is due to the chiefs of the various departments under the lead of the untiring general manager, to all of whom and to the employés generally, recognition is rendered for their faithfulness and efficiency.

Respectfully submitted by order of the Board.

J. H. DEVEREUX, *President.*

CLEVELAND, February 25th, 1884.

The directors elected for 1884 are as follows:

W. H. Vanderbilt, New York; C. Vanderbilt, New York; Augustus Schell, New York; J. H. Rutter, New York; A. G. Dulman, New York; W. Bayard Cutting, New York; J. H. Devereux, Cleveland; Stevenson Burke, Cleveland; James Barnett, Cleveland; T. P. Handy, Cleveland; Amos Townsend, Cleveland; G. H. Russell, Cleveland; B. S. Brown, Columbus; and the officers: J. H. Devereux, president; Stevenson Burke, vice-president; George H. Russell, secretary and treasurer; and E. B. Thomas, general manager.

Railway Matters in Canada.

TRAFFIC RECEIPTS OF THE CANADIAN PACIFIC DURING 1883—PROPOSED EXTENSION OF THE CENTRAL ONTARIO—RUMORED STRAINED RELATIONS BETWEEN THE CANADIAN PACIFIC AND THE ST. PAUL, MINNEAPOLIS AND MANITOBA—THE PROPOSED GREAT NORTHERN RAILWAY—DIRECTORS OF THE MONTREAL AND SOREL RAILWAY—RAILWAY TO BE BUILT IN CAPE BRETON—DOUBLE TRACKS ON THE GRAND TRUNK WANTED—PROPOSED BRIDGE ACROSS THE ST. LAWRENCE.

THE importance of the government scheme for assisting the Canadian Pacific—now passed—seems to belittle such railroad information as lies in your correspondent's way to present on this occasion. It may be well to say here that the traffic receipts of the Canadian Pacific Railway for 1883 are stated at $5,281,811, an increase of $2,648,391 over 1882.

A bill has been reported to the Dominion parliament, to authorize the Central Ontario Company to extend its line northward to the Canadian Pacific. The extension is expected to be used largely for carrying iron ore, which finds a market in the United States.

The rumor is widespread that at the next meeting of directors of the St. Paul, Minneapolis and Manitoba Railway, George Stephen, R. B. Angus and Donald A. Smith will be dropped from the board. Two reasons are given for this by the Montreal *Witness*. The above members of the Canadian Pacific syndicate, having not much further use for the St. Paul road in view of the progress of their own, have disposed of their interest in the former. Moreover, the relations of the above three directors with the president, Mr. Hill, have for some time been wanting in harmony. Mr. Hill is believed to have stoutly opposed the construction of the Canadian Pacific line on the north of Lake Superior, as it would take away a large part of the St. Paul road's traffic. The St. Paul road only runs to the frontier, and its connection between that point and Winnipeg has to be made over the Canadian Pacific track. Messrs. Hill and Kennedy having parted with their interest in the Canadian Pacific, the separation between the lines is now completed by the withdrawal of the syndicate from the ownership of the St. Paul and Manitoba.

The length of the great Northern Railway, to be made from the Ottowa River to St. Raymond will be 138 miles, and it is expected it can be built over an excellent location, very straight, comparatively level, and with maximum grades of about fifty feet per mile, at a cost of about $20,000 per mile. By this line the distance from Quebec to Montreal will be only twelve miles longer than the North Shore, whereas to Ottawa it will be forty-four miles shorter.

The newly-elected directors of the Montreal and Sorel Railway Company, are: James Armstrong, president; John Rankin, vice president; L. N. Massue, M. P., G. B. Carter and D. N. Armstrong.

The local legislature has granted a charter to the Cape Breton Railway Extension Company to construct a railway on the island of Cape Breton, the company to have the right of way, subject to action of municipal councils, and two thousand acres of land per mile. The line will be some eighty miles in length, extending from the Strait of Canso to Louisburg. The incorporators of the company are F. E. Sicope, president of the Anglesea Railway, Philadelphia; W. E. Crittenden, Bucyrus, Ohio; Hosea T. Stock, Toledo, Ohio; Wm. D. Church, Zanesville, Ohio; A. T. Tullock, Leavenworth, Kansas; John and Darby Bergin, Cornwall; James J. White, Ottawa; L. M. Shute, Philadelphia; Samuel Coulson, Montreal. The company will organize immediately with headquarters at Halifax.

The Grand Trunk Railway Company has a bill before the Dominion parliament to enable it to make certain financial arrangements with a view of obtaining funds to double its track west of Montreal. The cost of this work would be $13,500,000.

The proposed bridge across the St. Lawrence, at or near Quebec, the erection of which will be assisted by the government, is to be a modified reproduction of the bridge which is now being built over the Firth of Forth. The total length from shore to shore is placed at 3,100 feet, the superstructure at 2,800 feet, the two shore spans at 550 each, the two cantilever post sections 150 feet each, and center span 1,400 feet. The lengths of the superstructure of the Forth Bridge are about one-fifth greater. The cost of the bridge is estimated at $4,000,000. The government is asked to guarantee four per cent. on the amount.

Tramways.

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.
Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N.Y.

COMPRESSED AIR AS THE MOTIVE POWER ON TRAMWAYS.

WHILE New York is making up its mind to try the cable system of operating conveyances on tramways, San Francisco is considering seriously the expediency of superseding it by a system which is reported to be much more economical, both in first cost and operation. Indeed, machinery is now being constructed in that enterprising city, for the purpose of testing an invention for running the street cars by means of compressed air. Should coming experiments demonstrate the practicability of this, the Omnibus Railway and Cable Company of San Francisco will immediately adopt it. We think that if New York is wise, steps will be taken to prevent an enormous expenditure of money in what may prove to be, in a few months' time, an old-fashioned and superseded method of operating public conveyances. If it be so that the cable system is better than traction by horses, it may be that traction by means of compressed air would be more expedient than that by means of the cable.

With regard to this latter it has always been urged against it, that there is a large waste of power in its operation. The statement is made that only fifteen or twenty per cent. of the power is utilized in traction, the rest being expended in moving the cable and in friction. Accidents are numerous from the machinery getting out of order, and stoppages in the running of cars are unlooked for, sudden, and not infrequent. Moreover, the limit of the utility of the cable system in the case of curved ways, is reached disappointingly soon.

We await news from San Francisco, of experiments in operating tramway cars by means of compressed air, with keen interest. What remains to be done at the present time is to acquaint our readers with the details of the system as proposed.

By the new invention air is used at its lowest pressure to secure economy, or from eighty to 100 pounds per square inch. The machinery will be made light to lessen the amount of dead weight carried. The difficulty of keeping up a constant uniform pressure within practical limits seems to be removed by the new invention. It is proposed to erect an air-compressing machine at each end of the railway, which will send the air along a four-inch pipe main. The main will be two feet below the surface of the ground, between the up and down tracks. At every block, or closer if desired, there will lead from the main to the center of the track a branch pipe two inches in diameter, terminating in a valve-chamber with a valve held close by the pressure and spring. Above the chamber is an opening or slot in the street pavement to allow easy access to this branch pipe. On the car or dummy there is a couple of small storage tanks, each of thirty feet capacity, set under the car seats out of sight. An engine connects with the car wheels, and receives its supply of motive power from the air tanks. Leading from one of the storage tanks, both of which are connected, is a rubber hose, terminating in a nozzle like that of a fire hose. A small valve is placed in the end and kept closed by a spring. When the car stops for a passenger the engineer takes down the hose and inserts it in the slot or opening in the car track, and immediately two valves, one in the nozzle and the other in the branch pipe, are pressed apart and the air flows from the main into the storage tank on the car.

The Dublin United Tramways Company.

THE sixth ordinary meeting of the shareholders of this company was held in Dublin, Ireland, February 5, 1884.

It appeared from the director's report that the gross receipts for the half year ending December 31, 1883, amount to £55,445 0*s.* 6*d.*; and the working expenses to £40,934 3*s.* 2*d.* This leaves £14,510 17*s.* 4*d.* as net profit, which, together with £1,073 18*s.* 9d. brought forward from last half-year, is carried to net revenue account. The sum available for division, after writing off £921 1*s.* 1*d.* from valuation of horses and suspense account, and providing for debenture interest (amounting to £1,146 3*s.* 11*d.*), is £13,517 11*s.* 1*d.* Of this it is proposed to appropriate £10,974 to the payment of a dividend at the rate of four per cent. per annum (free of income tax), being four shillings per share for the half-year, the balance, £2,543 11*s.* 1*d.*, being carried forward. The gross receipts for the half-year show a decrease of £102 1*s.* 11*d.* as compared with the corresponding period of 1882. Three new cars were turned out of the company's workshops, and the whole cost charged against the revenue of the half year. The Forage account shows a decrease, the cost per horse per week being under 10*s.* 5*d.* The parcels delivery traffic is steadily extending, and shows a profit on the working for the half-year. The company had, on December 31, 976 horses. Thirty-two miles were open on that date. The total number of passengers carried during the half year was 5,406,813.

THE Comte de Liedekerke, representing a Belgian house, has obtained the concession of a network of steam tramways in Navarre, Spain, comprising a line from Pampeluna to Logrono, a second from Pampeluna to Irun, a third from Irun to Sanguesa, and a fourth from Puerta la Reina to Tafalla.

AT a meeting of the directors of the Brooklyn and Long Island Cable Railway Company, on the 15th inst., the following officers were elected: J. Rogers Maxwell, president; William Richardson, vice-president; Newberry H. Frost, treasurer, and Charles Bruff, secretary. The president, vice-president, treasurer, and Henry W. Maxwell were appointed on the executive committee.

THE first town to be entirely lighted and have its tramcars driven by electricity will be Montreaux, on the Lake of Geneva, a company having obtained a concession for the purpose. The motive power will be derived from the water of the lake.

Iron vs. Steel for Horse Railroad Tracks.

THE following letter from Mr. Augustine W. Wright, of Chicago, will be read with interest by all street railroad men. We shall be glad to have the views of practical men on this matter; our columns are at their service.

Editor of the American Railroad Journal:

I WAS asked at the last convention of the American Street Railway Association the following question by Mr. Cleminshaw (see report of second annual meeting, page 28): "You would recommend the use of steel rails for street railroads, would'nt you?" I replied in the affirmative, and stated that one steel rail would outwear five iron rails!

This opinion was formed from my experience upon *steam* railroads, and in support thereof, I would quote Mr. Price Williams, who stated that "the average life of the best quality of iron rails has been found to be in round numbers 15,000,000 tons. Vose, p. 361 of his manual, states that a pair of Bessemer steel rails on the London and Northwestern Railway outlasted sixteen faces of iron rails carrying 95,577,240 tons. (So, too, upon the Philadelphia, Wilmington and Baltimore R. R., a good steel rail has outlasted sixteen iron rails.) Where 12,000,000 or 15,000,000 of moderately fast traffic will wear out an iron rail, 38,000,000 tons of slow traffic are required to do the same.

Since October, 1883, when the above convention met, I have given this subject much consideration, and at the present time I am of the opinion that a *good* iron rail is best for many horse railroads. D. K. Clarke, in Vol. 2 of his work on Tramways, p. 171, says: "As to the material for tram-rails, it is not quite clear that steel is preferable to iron. The results of respective wears of steel rails and iron rails in Glasgow, reported by Messrs. Johnstones & Rankine, appear to show that the iron rails were as durable as the steel rails; whilst it is also apparent from the results of Mr. Cockburn Muir's tests for deflection that iron rails were, within their elastic limits, practically as stiff as steel rails." Dr. Dudley, chemist of the Pennsylvania R. R., in his able paper on "The Wearing Power of Steel Rails," said: "The forces that act between the top of the head of the rail and the wheels in rolling friction may, it seems to me, be regarded as two in number. There is first, a force acting directly downwards, due to the weight of the locomotives and cars. This force may be regarded as a vertical force acting perpendicularly to head of the rail, and is in action both when the train is standing still and when it is in motion. Secondly, there is a force acting parallel to the head of the rail, due to the traction or impelling power of the locomotives. In the case of the driving wheels, this force may be supposed to act in the direction opposite to that of the motion of the trains. * * * In the case of the drivers, the amount of this force acting parallel to the head of the rail is sufficient to overcome the total train resistance; in other words, to cause the train to move. In the case of the other wheels of the train, acting individually, this force parallel to the head of the rail is small, being only that necessary to cause the wheels to turn round; in other words, to overcome the journal friction. The force parallel to the head of the rail acts only when the train is in motion."

Returning for a moment to the conception previously mentioned, that the top of the head of the rail and the surface of the wheel are a rack and pinion with infinitesimal teeth, but without regularity in the teeth, let us see what kind of strain would be produced in these minute teeth by a force acting diagonally to the line of the head of the rail. I hardly see how we can avoid the conclusion that this strain would be a bending strain. * * * If we are right in regard to the nature of the surfaces involved in wear and the strains produced, wear is simply the breaking or pulling off of the infinitesimal teeth by the strains to which they are subjected. And here we see why it is that the softer rails give the better wear, for the harder the steel the more brittle it is; and the more brittle the steel the more readily will these infinitesimal teeth be broken off by the strains applied." A Penn. engine for passenger service, class "K" weighs, in working order, 96,700 lbs., of which 32,900 lbs. is on the first pair of drivers. Mr. Chanute's experiment showed that a driving wheel 5 ft. diameter only bore the thickness of a knife blade upon the rail head, about ¼ square inch, and at 40,000 lbs. per square inch of static pressure, the weight upon the driving wheel being 10,000 lbs.

Upon a horse railroad the rails are not subjected to this terrific force, and have only to support the *direct* pressure, due to weight of car and its load, and the force required to overcome journal friction, as so plainly shown by Dr. Dudley. The service performed by the rails upon steam and upon horse railroads is quite different. On the former the rail acts as a girder, carrying the weight from tie to tie. On the horse railroad it is, or should be, considered merely as a wearing surface to protect the continuous timber structure. The latter, besides cross tie bearing, is tamped, so that the track has a continuous bearing upon the earth. The force exerted by the locomotive, which is the prime cause of wear upon steam railroads, does not exist upon horse railroads.

Very few steam railroads can give the relative durability of steel and iron rails, and this is also true of horse railroads. I candidly admit that I cannot myself do so. Much depends upon the quality of the iron and of the steel if they are laid side by side. Steel rails that I laid on our main line Aug., 1879, are wearing rapidly and developing spots, but I have not yet had to replace steel rails. Our traffic, and consequent number of cars, increases rapidly, as does also the number of vehicles traveling upon the rails. The life of the iron rails replaced by this steel cannot, therefore, be compared with the life of the latter, the conditions vary so greatly.

The present cost of steel and iron is about the same, $37 per ton at mill. When worn out, the iron is worth as scrap, $20 per ton, and there is only a limited demand for the steel scrap. The president of one of the largest rolling mills in this country told me he would not give $5 per ton for old steel rails, delivered at his mill.

This is a matter fraught with great interest to all street railroad companies, and I trust, Mr. Editor, that this letter may call forth facts from the various companies, and would recommend it for discussion at the next convention of the American Street Railroad Association.

Respectfully yours,

AUGUSTINE W. WRIGHT.

CHICAGO, April 7th, 1884.

THE *Railway Review* gives the following statement of the earnings of the street railroads of New York city for the year 1883:

	Gross Earnings.	Operating Expenses.	Net Earnings.
Broadway and Seventh ave.	$ 889,614	$ 598,627	$ 290,986
Belt Line	789,906	547,560	252,346
Christopher & Fourteenth st.	219,869	174,471	45,397
Dry Dock & E. Broadway	890,796	574,595	316,200
Eighth avenue	752,590	559,630	192,960
Forty-second & Grand st. Ferry	419,275	268,926	150,349
Harlem Bridge & Fordham	157,402	129,058	28,314
Houston & West st.	224,768	172,305	52,462
Fourth ave.	740,000	502,732	237,066
Ninth ave.	133,094	157,015	6,079
Sixth ave.	856,850	667,137	189,712
Second ave.	899,719	661,880	237,838
Third ave.	1,524,568	1,034,311	490,257
Central Cross Town	168,436	135,980	32,457
Twenty-third st.	521,055	362,732	158,323
	$9,197,942	$6,516,959	$2,680,746

New Brake for Tramway Cars.

GEORGE W. COFFIN, Pittsburgh, Pennsylvania, has invented a device which has for its object the setting, releasing and adjusting the brakes of a car, by means of a worm or perpetual screw operating in a toothed wheel attached to a cylinder or drum carrying a chain connected to a lever of the brakes, so that by turning the perpetual screw in one direction the chain will be wound around the drum in such a manner as to draw the brakes gradually and tightly against the wheel of the car, and there rigidly hold them without danger of relaxation or sudden release until so required, when by turning the perpetual screw in a reverse direction the chain will be unwound, whereby the brakes may be at liberty to fall back from the wheels.

To put his invention into practice, Mr. Coffin constructs a metallic box, preferably formed in two pieces substantially alike, which constitute a receptacle and support for such parts as are intended to operate therein. The two halves of this box are securely united the one to the other by means of vertical bolts, of sufficient length to pass through and thereby affix the box underneath the platform of a car. The rear end of this box is open, and in the forward or closed end is arranged in bearings a short hollow cylinder, across the outside of which is formed a spiral worm or perpetual screw. As a means for rotating this screw it is provided with a removable axis or shaft, the lower part of which is square, and in that respect corresponds with the hollow of the cylinder through which it extends. The upper end of this shaft is furnished with an ordinary winch or hand crank, by the instrumentality of which power may be applied to the screw. At right angles to the spiral worm, and centrally within the box, is arranged a small shaft, carrying a toothed wheel, which engages the perpetual screw; and

this wheel is provided with a cylindrical drum, having attached thereto one end of a chain, the other end of which is connected to a long rod, made fast to the lever of the brake. It is obvious that on turning the screw in one direction the toothed wheel will rotate and wind the chain upon the drum, and thus draw the brakes against the car-wheels and there hold them without the use of clutch or analogous contrivance. When required, they may be released by simply turning the screw in a reverse direction.

Superior applicability to street cars is claimed for this brake, because it requires no ratchet. As it holds just where it is left, the driver can take his hands off the crank, and give more attention to the horses and his lookout for passengers. The chain and upright shaft with crank ordinarily in use will answer for the Coffin brakes, by having the lower end of the shaft made square for about six inches, so that it will fit the worm.

The inventor claims all the advantages in the use of his brakes for railroad cars which he does for street cars, even more; for instance: If a loaded car is placed on a siding, the brake can be drawn tight, and the upright shaft removed and thus prevent accidents by persons loosening the brakes. On platform cars when loaded with timber or lumber which reaches over the brakes, the upright shaft can be removed in an instant, thus obviating the danger of breaking or bending the shaft. The advantage of dispensing with the ratchet is obvious. Mr. Coffin's invention is under examination by the Pennsylvania Railroad Company.

TRAMWAY NOTES.

TWENTY new cars were put on the New York Fourth Avenue Railroad, March 29. They are provided with iron life preservers, which, in the form of a semicircle at the front and back of the cars, prevent the horses from going under the vehicle in case they fall, and act as a similar safeguard in regard to men and women. At the side of each window hangs a leather strap, which when pulled operates upon a small whistle, designed to attract the attention of the conductor. The cars are ventilated along their entire length. The carpeting on the seats is flowered and of the brightest shade of red. New horses and newly-engaged conductors, wearing a uniform, increase the attractiveness of the addition to the facilities of the route.

OUR contemporary, *Tramways*, a well-informed and useful exchange, published in London, reports the organization of "The Tramways Association of Great Britain and Ireland," on the third of March last. The object of the association as stated in the above paper, is that it shall "fully and fairly represent the important interests connected with tramway enterprise." Robert Hutchison, of Carlowrie, chairman of the Edinburgh Street Tramways Company, was elected the first president; and Jenkyn Ingram, secretary. *Tramways* devotes large space to reports of meetings. Its matter is well-arranged and neatly printed. The issue of March 15 was the fifth from the beginning.

PART I of the new Tramways and Public Companies Act (Ireland), enables the grand jury of a county to guarantee out of the rates of a barony a dividend not exceeding £5 per cent. of the paid-up capital of a tramway company. The treasury returns half the guarantee paid by the county, not exceeding £2 per cent. per annum in the paid-up capital, and in this respect the treasury is not to exceed £40,000 a year. Part II increases the financial powers of officials in assisting emigrants, and enables the treasury to assist public companies with funds to enable them to acquire land for sale to tenants.

A $25,000 horse railroad is to be built in Holyoke, Mass., and will probably be in operation by June. The road will be built from South street at South Holyoke, to the foot of North Main street, South Hadley Falls, a distance of two miles. A track about 500 feet long will be laid from the corner of Lyman and Main streets to the new depot of the River Road.

THE Rasmussen Western Cable Railway Co., has been incorporated. The incorporators are W. C. Wachsmuth, M. A. Farr, E. L. Brewster. The capital stock is $1,000,000.

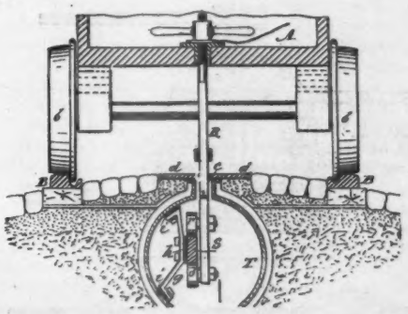
THE work of laying the cable road on Seventh and Franklin streets, Philadelphia, will be commenced shortly.

B. W. RUSSELL has been elected treasurer of the new Danvers and Salem Street Railway Co.

Recent Inventions Relating to Tramways.

294,618. GRIP FOR ELECTRIC CARS: John Carlos Henderson, New York, N. Y.

Brief.—Device for increasing friction of car-wheels upon rails of the track. The bar S may serve as electrical conductor.

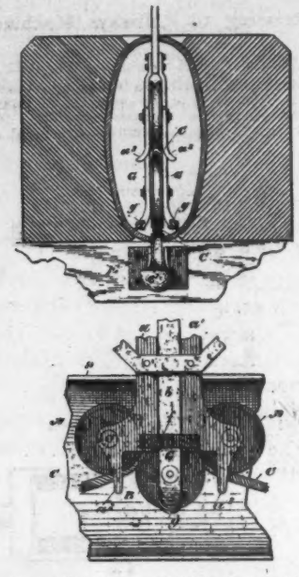


Claim.—The combination, with an electric-motor drive-car having a hole in its bottom, of a top-threaded rod R, carrying a nut at the upper end and rollers *r s s* at the lower end, and the longitudinally-slotted tube T, carrying within it the fixed rail S, as and for the purpose described.

294,948. GRIPPING MECHANISM FOR TRACTION-CABLE RAILROADS: John W. Young, Fort Maroni, Ariz.

Brief.—Gripping-sheaves arranged relative to each other, so that when applied the cable will be positively nipped between them. The movable hanger has depending arms carrying one of the sheaves, which arms rest upon the bottom of the cable-tunnel when the car is at rest, thus steadying the grip-frame while the cable is running through the grip.

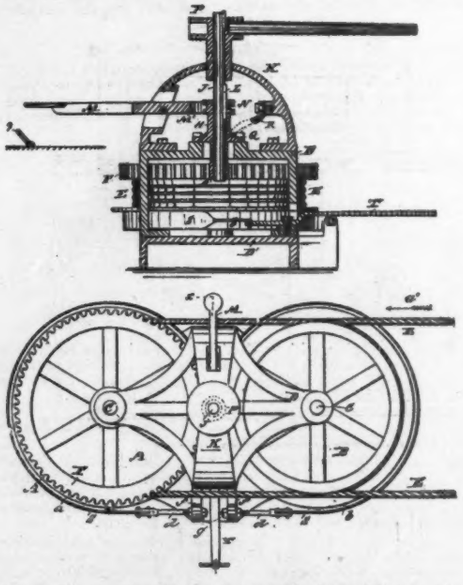
Claim.—1. In a grip mechanism for traction-cables, the combination of two sheaves for gripping an endless traveling cable with mechanism for operating one or both of the sheaves, said sheaves not being directly opposite to each other with respect to the cable, but so arranged that they will press on both sides of the cable when the grip is applied to its full extent, substantially as and for the purpose set forth.—2. In a grip mechanism for traction-cables, the combination of two sets of sheaves for gripping an endless traveling cable, one of which sets may consist of a single sheave, with mechanism for operating one or both sets of sheaves, said sheaves alternating with each other, and arranged so that they will press on both sides of the cable when the grip is applied to its full extent, substantially as and for the purpose set forth.—3. In a grip mechanism for endless traveling traction-cables, the combination of sheaves A A' and sheave B with mechanism for drawing the latter sheave in toward the former pair of sheaves, the sheave B being placed opposite the space between the sheaves A A', and the width of the space between the sheaves A and A' being less than the diameter of the sheave B plus twice the thickness of the cable to be used, said sheaves being constructed so that they will pinch the cable when the grip is applied to its full extent, substantially as and for the purpose set forth.—4. In a grip mechanism for endless traction-cables, the combination of the movable hanger *b*, supporting-legs G, and cable-lifting sheave B, journaled in said legs, with the cable-guide D, and suitable cable gripping and sheave-lifting devices on a car, substantially as herein set forth.—5. In



a grip mechanism for endless traction-cables, the combination of the stationary hangers *a a'*, having bottom outwardly-turned guides, *a'* with the sheaves A A' and the movable hanger *b* and sheave B, substantially as and for the purpose set forth.

294,053. FRICTION-DRUM FOR INCLINED-PLANE CABLE-RAILWAYS: Earle C. Bacon, Brooklyn, assignor to Copeland & Bacon, New York, N. Y.

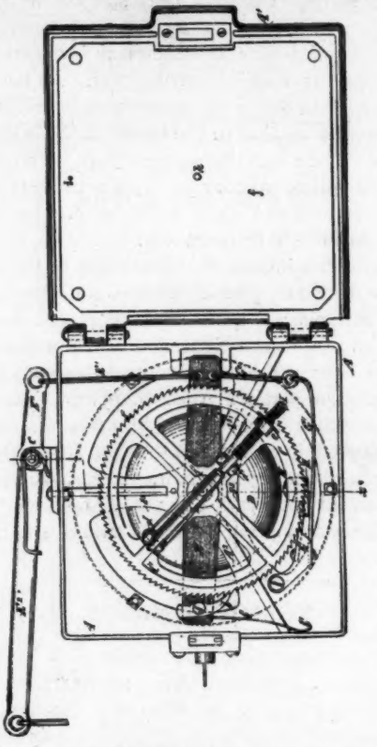
Brief.—The endless cable of an inclined railway is rove around two drums at the top of the incline, a strap-brake being applied to each drum and operated by one lever. The initial movement is given to the loaded car through a vertically-adjustable rotary shaft carrying at its lower end a pinion which is capable of meshing with a gear upon one of said drums.



Claim.—1. In a cable-railway, the combination, with the cable, of two friction-drums, around which the cable passes, and of a brake-band for each drum, substantially as herein shown and described, and for the purpose set forth.—2. In a cable-railway, the combination, with the cable, of two friction-drums, around which the cable passes, a brake-band for each drum, and of devices for applying both brake-bands simultaneously, substantially as herein shown and described, and for the purpose set forth.—3. In a cable railway, the combination, with the cable, of two friction-drums, around which the cable passes, a brake-band for each drum, and a lever connected with both bands, substantially as herein shown and described, and for the purpose set forth.—4. The combination, with a friction-drum, of a brake-band, S, the lever T, the rod *d*, and the tension-adjusting nut *e*, substantially as herein shown and described, and for the purpose set forth.—5. The combination, with a friction-drum for a cable, of a cog-wheel united with the said drum, and of a pinion mounted on a shaft that can be rotated, which pinion is adapted to be engaged with the cog-wheel, substantially as herein shown and described, and for the purpose set forth.—6. The combination, with a friction-drum for a cable, of a cog-wheel united with the said drum, of a pinion mounted on a shaft that can be rotated, and devices for engaging the pinion with the said cog-wheel, substantially as herein shown and described, and for the purposes set forth.—7. The combination, with the cable-drum A, of the cog-wheel F, united with the same, the shaft J, provided with devices for turning it, the sleeve H, the pinion G, mounted thereon, and devices for vertically adjusting the said sleeve, substantially as herein shown and described, and for the purpose set forth.—8. The combination, with the cable-drum A, of the cog-wheel F, united with the same, the shaft J, provided with devices for turning it, the sleeve H, the pinion G, the lever M, the ratchet-wheel Q, and the pawl R, substantially as herein shown and described, and for the purpose set forth.

295,051. FARE REGISTER OR RECORDER: Reuben M. Rose, Brooklyn, N. Y., assignor to David F. Atkins, same place.

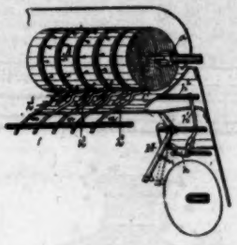
Claim.—1. In a fare register and indicator, the combination of a concealed dial and means for recording or marking thereon, a visible dial and an index



for indicating thereon, and a hollow spindle carrying said index, and serving as a passage for a rod by which the recording or marking device may be operated or moved to cause it to register or mark on the concealed dial, substantially as described.—2. The combination, with a ratchet-wheel, a hollow spindle on which the wheel is mounted, and means for imparting a step-by-step rotation to the said wheel, of a dial, a radial arm carried by said wheel and provided with a marking device, and a pin adapted to be inserted through the hollow spindle to press upon the said arm, and so cause its marking device to make a deep or heavy impression on said dial, substantially as herein described.—3. In a fare register and indicator, the combination of a case composed of two portions hinged together, a spindle and a marking device adapted to turn therewith, both being supported and carried wholly by one portion of the case, a filing or indicating point on the other portion of the case in such position that when the case is closed said point will be opposite the center of the spindle, and a paper or analogous dial provided with a hole adapted to said filing or indicating point, whereby provision is afforded for properly centering the dial relatively to the spindle when the case is opened to enable the dial to be placed in position, substantially as described.—4. The combination, with the ratchet-wheel, C, means for imparting to it a step-by-step rotary motion, and a radial arm provided with a marking device carried by said wheel, of the back plate A', provided with a central gage, and the dial J, provided with a central opening, substantially as and for the purpose herein described.—5. The combination, with a fare register or indicator case having a bridge provided with a central bearing extending across it and dividing it into two compartments, of a spindle fitting the bearing, a ratchet-wheel and its actuating-lever mounted on the spindle on one side of the bridge and in one of said compartments, a bell approximately concentric with the spindle and arranged on the other side of the bridge in the other compartment, and a bell-hammer actuated by said ratchet-wheel and extending across or beyond the bridge to operate on the bell, substantially as herein described.—6. The combination, with a bell-hammer and a spring for impelling it against a bell, of a puli-rod or device for operating the bell, and a connection between the spring and pull-rod or device, whereby the force of the spring will be increased at the time the blow is struck by the hammer, substantially as and for the purpose herein described.—7. The combination, with the ratchet-wheel C and the bell-pawl G, of the spring G', connected with the bell-pawl, mechanism for imparting a step-by-step rotation to the said wheel, and a pull-rod or device connected with the said mechanism for operating it, and also connected with said spring for simultaneously increasing its force, substantially as herein described.—8. The combination of the spindle B, wheel C, lever E, pull-rod or device E', actuating-pawl *b*, bell D, bell-pawl G', and rod C, all arranged and adapted to operate, substantially as herein described.—9. The combination, with the visible dial *f* and hand or pointer, *l*, of the setting bar or arm L, the notched rim *m*, and the removable stop-pin *p*, all arranged and adapted to operate, substantially as and for the purpose herein described.

294,462. FARE-BOX: Jas. F. Goodridge, Boston, Mass.

Claim.—In a fare-box, the combination, with the ticket feed-roll and its actuating mechanism, of an alarm, a stop to prevent the alarm from sounding, and means, substantially as described, by which the passage of a ticket will remove the stop and allow the alarm to sound, substantially as and for the purposes set forth.



CONSTRUCTION NOTES.

THE Lackawanna road has been trying to devise some method whereby it could reach Toledo and make connection with the Wabash road without using the present trunk lines. It has now decided to build its own line, and, according to an officer high in authority, a number of engineers will be at work, shortly, under the direction of C. C. Rose, principal assistant engineer. The line will begin at a point near South Buffalo, and will follow the line of the Nickel Plate and Lake Shore Roads to Toledo. It was thought that an arrangement would be entered into with the Buffalo, New York, and Philadelphia by which the line of the latter would be used to Brockton, but it is understood this will not be, and the company will build its own line between the points named. A mysterious survey along the north side of the Lake Shore was made last summer, and this is thought to have been one of the preliminary lines. But nothing definite could be found out about it. The new line will be pushed rapidly to completion as soon as it is located.

OVER SIX MILES OF TUNNELS.—In constructing the new Vanderbilt route from Harrisburg to the Western Pennsylvania bituminous coal fields, it will be necessary to tunnel the Blue Ridge, Kittanning Mountain, Tuscarora Mountain, Sidelong Hill, Ray's Hill, the Allegheny Mountains, Quinnamahoning range, and the Sewickley Mountains, making over six miles of tunnels. These tunnels are on eighty-three miles of the route. The Blue Ridge and Kittanning tunnels are only a mile apart, and the Sidelong and Ray's Hill tunnels only two miles apart. The work is under contract to be completed by June 1, 1886.

THE matter of securing the right of way for the proposed new railroad from Fort Plain to Richfield Springs is nearly settled. It is now confidently held that work will be commenced at once, and vigorously pushed during the spring, so as to catch a share of the summer traffic.

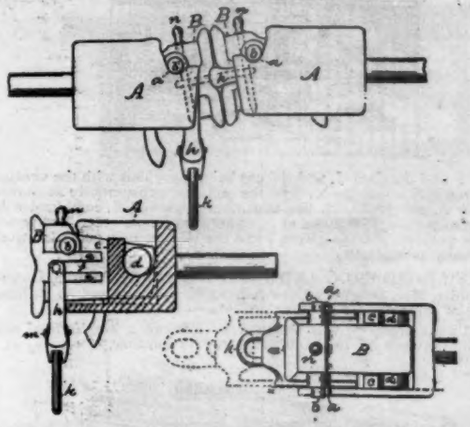
ARRANGEMENTS have been made by the Reading Railroad Company for widening the cuts along the Lebanon Valley Railroad, to prepare the road for the increased travel expected when the Vanderbilt line from Harrisburg to Pittsburgh is ready. Wherever there is only a single track now, a double track is to be laid.

THE plan of a bridge over the St. Lawrence River, to be constructed by the Ottawa, Waddington and New York Railroad and Bridge Company, was adopted by the Privy Council at Ottawa, Canada, on March 14th.

Recent Patents Relating to Railways, Machinery, Etc.

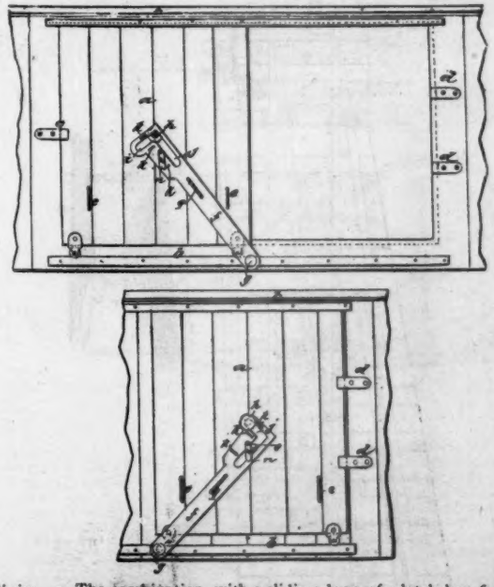
294,345. CAR-COUPLING: Arthur H. Armstrong, Plainville, Conn.

Claim.—The combination of the main head A, having trunnion-recesses *a* at its outer end, and the cheeks *c* upon the inside at its inner end, with the supplementary head B, having trunnions *b* and *d*, and the latter of which receives the drawing strain, substantially as described, and for the purpose specified.—2. The combination of the coupling, the longitudinally sliding and swinging bail, and the coupling-link secured within the cross-arm of said bail, substantially as described, and for the purpose specified.—3. The combination of the supplementary head B, having side cheeks *c*, the longitudinal slot *f*, and the swinging bail *h*, carrying link *k*, and having inwardly-projecting trunnions *g*, for engagement with the slot *f*, substantially as described, and for the purpose specified.—4. The combination of the main head A, supplementary head B, and the sliding and swinging bail carrying the coupling-link, substantially as described, and for the purpose specified.—5. The combination of the main head A, supplementary head B, the bail carrying the coupling-link, and means located within the walls of the main head for guiding the inner end of the bail longitudinally, and also allowing it to swing freely within said walls, whereby the bail is protected from injury, all substantially as described, and for the purpose specified.



294,513. CAR-DOOR LOCK: Jas. Sharkey, Honey Creek, Ind.

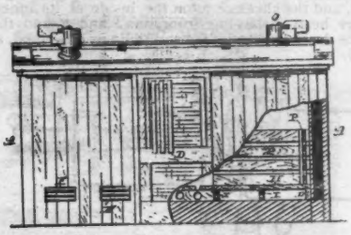
Brief.—A latch-bar pivoted under the lower back corner of the door-opening is connected to the middle of the sliding door by a stud-pin on the door engaging an angular slot in the end of the bar. The stud-pin is held in the end of the slot by a sliding bolt on the latch-bar held by a pivoted link secured over a staple on the sliding bolt.



Claim.—1. The combination, with a sliding door, of a latch-bar *f*, pivoted to a permanent support at the lower back corner of the door and connected to the door at the middle, or thereabout, by a stud-pin *h*, in the door and the angle-slot *i j* in the bar, said bar being inclined, so that it gravitates to a rest at the upper end of slot *j* on the stud *h*, and thereby forms a latch to fasten the door shut, substantially as described.—2. The combination of a slide-bolt *l*, having staple *m* for a lock, *p*, with the latch-bar *f*, having staples *k* and link *n*, pivoted to a support and connected to the door, as shown and described, the said staples *k* and bolt *l* being located between the part *i* of the slot and the stud *h*, to lock said stud in the upper end of part *j* of the slot, substantially as described.

294,574. CAR: Richard H. Briggs and Cleveland Prichard, Whistler, Ala.

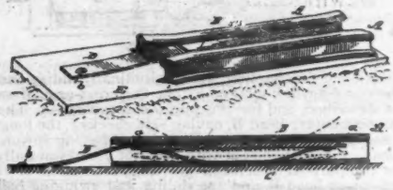
Claim.—1. The combination of the car with sections of flooring which are placed in the ends of the car, and the section of flooring which is placed at right angles thereto, each section being composed of the perforated



cross-bars I and the slats J, and the car being provided with the ventilating-openings F B below the level of the sections, substantially as shown. —2. The car A, provided with the ventilating-holes B F, combined with the sections of flooring, arranged at right angles to each other, and provided with the perforated cross-pieces I and the side sections or lattice-work P, substantially as set forth.

294,598. RAILROAD FROG AND SWITCH GUARD: Philip S. Dusenbury, Sedalia, Mo., assignor of one-half to W. Z. Baum and A. H. Randall, both of same place.

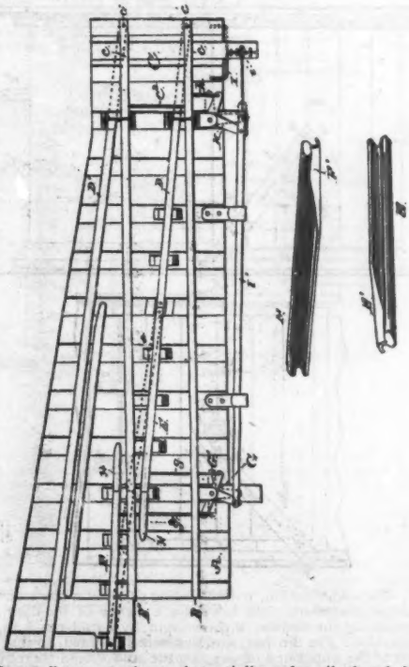
Brief.—A plate provided with shouldered ends and a longitudinal side flange placed between the rails and supported by a spring.



Claim.—1. In a guard for railway-crossings and switch-frogs, the strap D and the plate B, provided with shouldered ends and longitudinal flanges *d*, said plate being placed between the rails and supported by a spring, C, substantially as and for the purpose set forth.—2. In a guard for railway crossings and switches, the combination, with the plate having the end shoulders, *a*, and longitudinal flanges *d*, of the spring C and the strap D, secured at one end to the bed-plate, the opposite end resting on a shoulder of plate B, substantially as and for the purpose set forth.

294,664. RAILROAD-FROG: John F. Penrod, Derry, Pa.

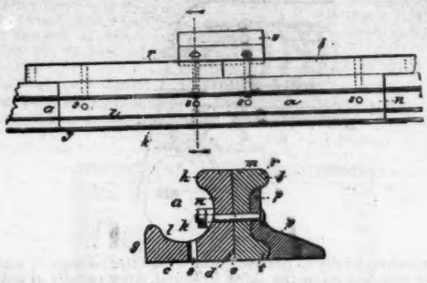
Brief.—A railway-crossing in which the main rail is unbroken and the movable cross-over rails are protected by fixed sections of rails which register with them when they are not in use.



Claim.—In a railway-crossing, substantially as described and shown, the combination, with the unbroken main-line rail and the pivoted movable rails E F, of the protecting rails or sections H H, secured on the track in position to register with the movable ends of the rails E F when the latter are adjusted away from the fixed rail, substantially as described, and for the purposes set forth.

294,743. REVERSIBLE SECTIONAL LAP-JOINT RAILWAY-RAIL: Hansford D. Norrell, Richmond, Va.

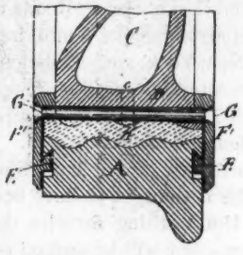
Brief.—A railway-joint consisting of two rail-sections—one L-formed, the other I-formed—with half-heads, the sections being reversible.



Claim.—1. The L-form railway-rail section having plane faces meeting at right angles to each other, and half-heads arranged, respectively, in vertical and horizontal position, substantially as specified.—2. A lap-joint railway-rail composed of the reversible L-shaped sections *a*, the reversible I-form section *b*, the coupling-plates *v*, and coupling-bolts, substantially as specified.

294,750. CAR-WHEEL: Anson Atwood, Dunellen, N. J., assignor to the Atwood Hemp Car Wheel Company, New York, N. Y.

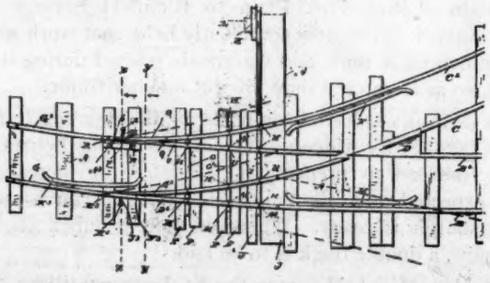
Claim.—1. The combination of an elastic packing K, with the tire A and rim D, having corresponding corrugations or roughenings upon their adjacent faces so shaped as to lock the tire against both lateral and rotary slip on the wheel, substantially as described.—2. The combination of the rim D, tire A, and elastic packing, with their circumferential corrugations, with the loosely-engaging tongue and groove upon the tire, and flange or ring, and with suitable means for preventing rotary slip, substantially as described.—3. The combination of the tire A, rim D, packing K, flange F or ring, or rings F', loose tongue-and-groove lock E, and bolts G, having no metallic contact with tire or rim, substantially as



described.—4. The combination of the tire A, rim D, packing K, flange F or ring F', lock E, and bolts G, passing through grooves in the rim, with the lip *g*, substantially as described.—5. The combination of the tire A, rim D, packing D, rings or flange F F', lock E, bolts G, and keys H, substantially as described.—6. The compound of fiber and vaseline for packing railway-car wheels, substantially as described.—7. A car-wheel having the separate tire and a body cast in one piece, consisting of the hub and rim, with the intermediate double-arched portion, having sand-holes from the inner arch through the hub and from the outer arch through the rim, and with unperforated sides, substantially as described.—8. In a wheel having a tire, A, capable of yielding radially to thrust or jar, the combination of the body, tire, and a loose tongue-and-groove lock E, connecting the tire to the body, substantially as and for the purpose described.

294,904. RAILWAY-SWITCH: William W. Pennell, Nashville, Ohio.

Brief.—The two point or inner rails of the main and siding switches are secured to outer pivoted rails of said sections, the siding-point being secured by a spring-bolt to yield to the wheel-flange. The other point is formed with a groove for wheel-flange and bolted to a correspondingly-grooved block, the adjacent pivoted rail being cut away to receive the tapered end of the grooved point-rail. The vibrating ends of the switch-rails rest in beveled seats in shifting blocks, one of which is connected with an operating-lever. In the normal position of the tracks the main is closed to trains facing the points, while movement in the opposite direction from either track is permitted.

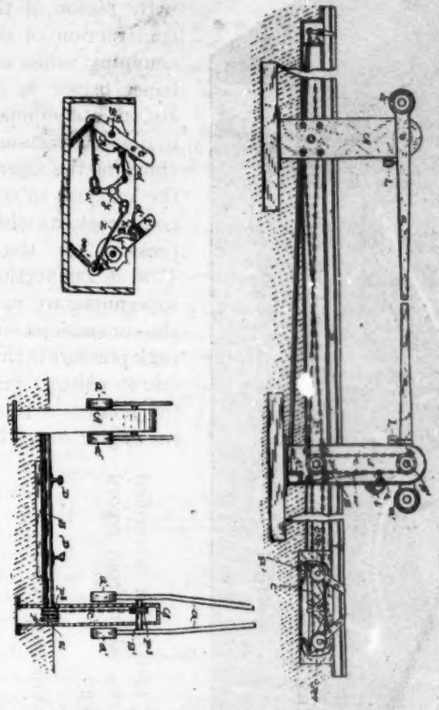


Claim.—1. The combination of the main track and sidings, the continuation of the main track, the rails Q and D of the switch, pivoted at their ends adjoining the continuation of the main track, the rail U, having one end connected to the rail Q and cut down at W, the block or plate A, having the groove C, the rail G, connected to the pivoted end of rail D by spring mechanism, and the sliding blocks or chairs for carrying the rails of the

switch and retaining them in position, substantially as and for the purpose set forth.—2. The combination, with the main track and sidings, of the switch, comprising the rail Q, pivoted at R, and formed with the beveled notch S, the rail U, tapered at its end V to correspond to said notch S, and having this tapered end cut down at W, devices securing these rails together, the rail D, pivoted at E, the rail G, having the beveled end F, the spring-actuated bolt H, for securing these rails together, the plate A, having the groove C, and the sliding blocks having the recesses that receive the ends of the rails of the switch to operate and retain the same in position, substantially as and for the purpose set forth.

294,765. RAILROAD-CROSSING GATE: Joseph Coty, Joliet, Ill.

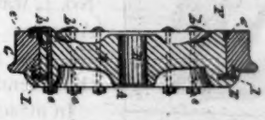
Brief.—A railroad-gate worked by levers operated upon by the tread of the car-wheels. The levers carry ratchets, and are returned to their normal position by springs. Through sheaves, chains, and Y-shaped piece connected to the levers the successive wheels of the train lower or raise the gate-bars gradually.



Claim.—The combination of the gate-bars *a*, shaft S', sheaves P P P, chains *c c c'*, posts A, levers *t t'*, links *z v w*, Y-shaped piece *y*, springs *m m'*, ratchets R R', pawls *x x*, rock-shafts S R, and sheaves P P', all arranged to operate substantially as and for the purpose set forth.—2. The combination of the levers *t t'*, pawls x x, ratchets R R', links *z v w*, coil-springs *m m'*, sheaves P P', Y-shaped piece *y*, and chains *c'* c, by means of which successive wheels of the approaching train lower the gate-bars *a a*, or elevate them, gradually, in the manner and for the purpose set forth.

294,890. CAR-WHEEL: William I. Lindsay, Cleveland, Ohio.

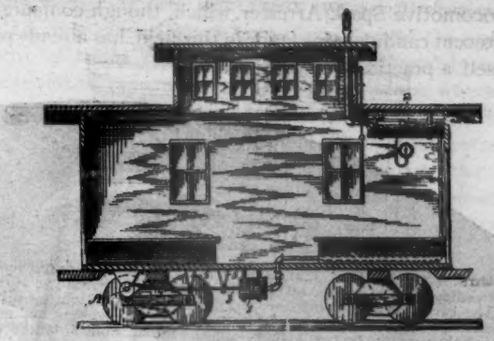
Claim.—1. The body and tire of the wheel, provided with the interlocking tongue and grooves, in combination with the bolt passing through the body, and provided with the pin for engaging the tire and with the nut for securing the parts together, substantially as and for the purpose set forth.—2. The body of the wheel, provided with the angle-iron, and with the annular tongue and groove for engaging the corresponding tongue and groove formed in the tire, in combination with the bolt and pin for engaging the body and tire, substantially as and for the purpose set forth.—3. The body and tire of the wheel, provided with the interlocked tongue and groove, in



combination with the dowel-pin for engaging the adjacent faces of the body and tire, and the bolt and pin for securing the parts together, substantially as and for the purpose set forth.—4. In combination with the sections A B of the herein-described car-wheel, the dowel-pins *a'* and bolts *c* and re-enforcing angle-irons, substantially as and for the purpose set forth.

295,144. CAR-SIGNAL: William D. Beaty, Mannington, W. Va.

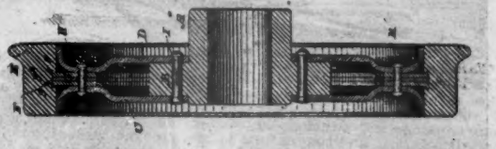
Claim.—1. In a signal-car, and in combination with the alarm thereof, the shaft A, secured beneath the car, provided with friction-wheel B, adapted to bear on the axle, and having a crank-turn, to which is secured the piston-rod of an air-pump, 1, which forces air into a reservoir, where it is held under pressure for subsequent use, the lever O, pivoted within the car, and connected to the end of the shaft A by the link *b*, and held in any desired position by the serrated plate *c*, substantially as described.—2. In a car-signal, and in combination with the alarm thereof, the shaft A, secured beneath the car, provided with friction-wheel B, adapted to bear on the axle, and having a crank-turn, to which is secured the jointed piston-rod of an air-pump having valved piston-head, said air-pump being secured to the bottom of a car, and adapted to force air through connecting-pipes into a reservoir, 2, and means for raising, lowering, and holding in place the shaft A, consisting of the lever O, pivoted inside the car, and connected to the end of the shaft A by link *b* and plate *c*, for holding the lever in any desired position, substantially as described.—3. In a car-signal, the combi-



nation of the shaft A, secured beneath the car by the hangers *a a'*, the latter of which is slotted, as described, having the crank-turn, to which is secured the jointed piston-rod supported by the hangers 5, the air-pump 1, secured beneath the car, reservoir 2, whistle, connecting-pipes, and the lever O, pivoted within the car, and connected to the shaft A by link *b*, and held in place by serrated plate *c*, all substantially as described.

294,995. CAR-WHEEL: John A. Hagan, Three Rivers, Mich., assignor, by mesne assignments, to the Hagan Steel Car Wheel Company, same place.

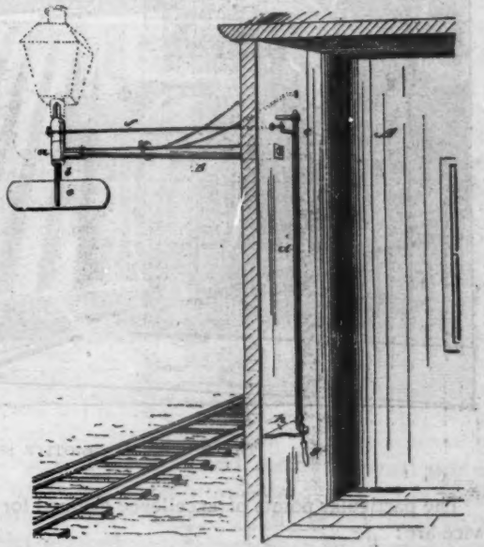
Claim.—1. The combination, with a tire for a car-wheel having a dovetail annular groove in its inner face, of a sectional dovetail ring secured in such groove, substantially as set forth.—2. The combination, with a hub of a car-wheel and its tire provided with a sectional dovetail ring, of side plates or disks pressed between the hub and tire and bolted to the hub and



ring, substantially as set forth.—3. In a car-wheel, the combination, with a hub and tire provided with a sectional dovetail ring, of side plates or disks having flanged rims, and bolted to the hub and ring, substantially as set forth.—4. In a car-wheel, the combination, with a hub and a tire provided with an internal sectional dovetail ring, of side plates or disks with rims curving outwardly from the depending flange, and bearing against the tire, and bolted to the ring and hub, substantially as set forth.

295,264. RAILROAD-SIGNAL: John Mayne, Atchison, Kans.

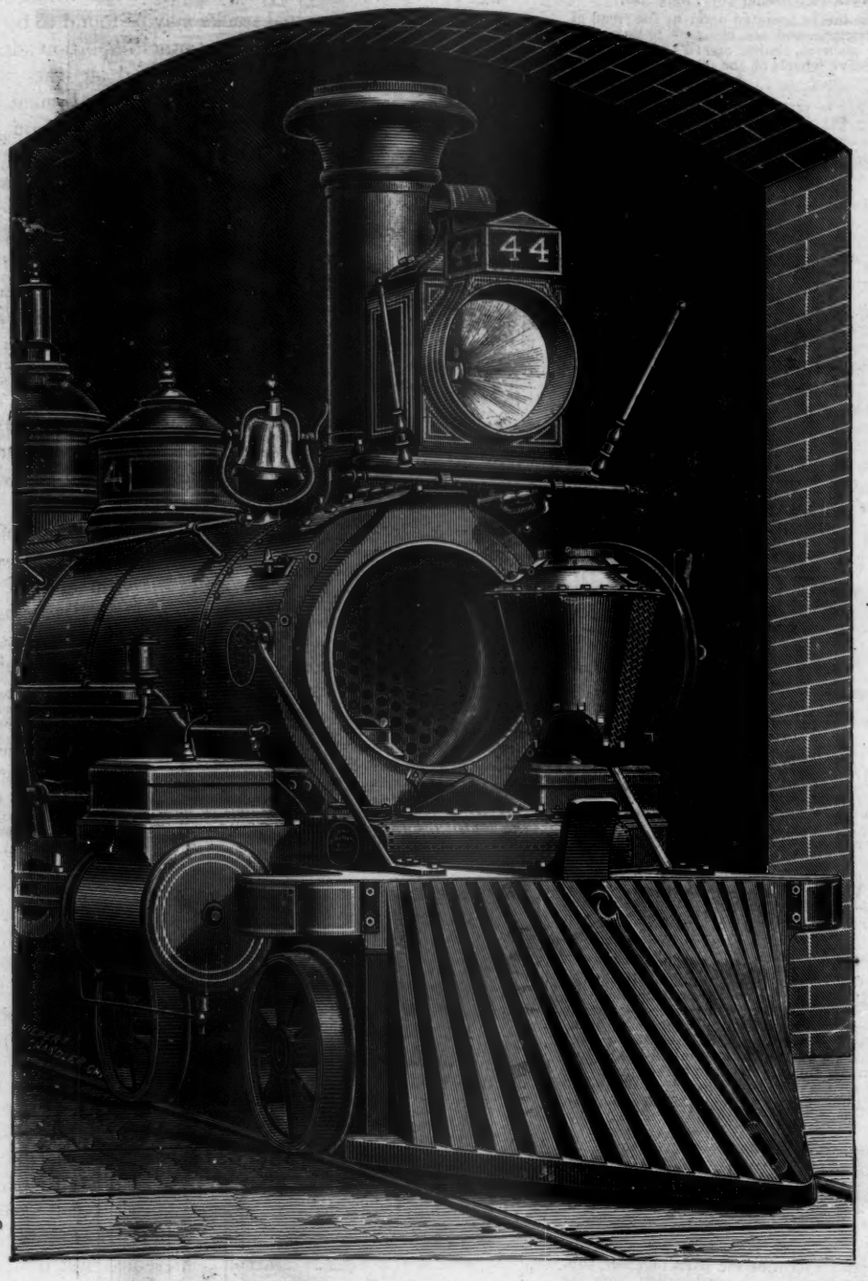
Brief.—This device embraces a signal supported near the track by a bracket fixed to the outside of the station-building, and means, as described, for operating the same from a hand-lever arranged within the building.



Claim.—In a railroad-signal, the combination, with the support B, having an upright box, *a*, at its outer end, and the vertical shaft *d*, bearing in a notched plate, *h*, at its lower end, and having a pivoted handle *g*, of the shaft *b*, passing through and supported upon the box *a*, and carrying the board *c* and a lamp, and the rod *f*, connected to the shaft *b* and to a crank, *e*, of the shaft *d*, substantially as and for the purpose set forth.

The Hunter Locomotive Spark Arresters.

We present herewith drawings and explanation of a Locomotive Spark Arrester, which, though comparatively a recent candidate for favor in this field, has already proved itself a practical success.



THE HUNTER LOCOMOTIVE SPARK ARRESTERS.

The particular points of excellence claimed for this device are:

The arrest of all cinders and sparks and deposit of them in a convenient receptacle, where they are immediately extinguished; so that they may be dumped on any portion of the track, while the train is running, without danger of firing ties or stringers,

An equalization of the draft, which compels each flue to do its proper share of work, and thus reduces the necessity of cleaning them.

The reduction of cost for repairs to the minimum, as there are no wire screens to wear and burn out.

Convenience of arrangement for repairs when needed. By opening the door of the smoke box, immediate access to steam pipes, tubes, etc., is had.

By reason of the peculiar construction of the exhaust confining tubes, a larger exhaust orifice is admissible; and this combination tends to create a vacuum in the vicinity of the open joints of the exhaust tubes, which is commensurate with the steam pressure in the cylinders. This, in connection with the supernumerary exhaust nozzle—or spark jet—reduces the back pressure in the cylinders, due to exhaust resistance, to the minimum, thus allowing the engine to work free.

Reduction in cost of fuel, which is verified by the following statement, taken from record books of the Vandalia line:

MONTH OF NOVEMBER, 1883.

No. Eng.	T's Coal.	Miles Run.	Car Miles.	Car miles per ton of Coal.
44	135	4,110	39,940	295.8
179	164	3,698	42,478	259.
180	177	3,348	39,147	221.1

These engines hauled the same train, during the month. No. 44 was equipped with the Arrester and Extinguisher. Engines 179 and 180 are of the extended smoke box type.

In attaching this device to the ordinary locomotive, no extension of the buffer beam is necessary, unless it is desired to use a very large cinder receptacle; the ordinary size being competent to carry a box which will hold thirteen bushels.

The invention, the use of which has been found so valuable, is manufactured by the Hunter Locomotive Spark Arrester Company, Terre Haute, Indiana. We append three letters containing statements which strongly present the advisability of its adoption;

TERRE HAUTE, IND., Jan. 25, 1884.

Geo. D. Hunter, Esq., Supt. Hunter Spark Arrester Co.:

DEAR SIR:—In answer to your inquiry as to what satisfaction your Spark Arresters are giving, will say that we have now two in use—one on a light passenger engine 15x22, the other on one of our heaviest passenger engines 18x24, pulling heavy passenger trains, consisting of from ten to fourteen cars, at an average speed, including stops, of thirty-two miles per hour. The arrangement of the parts in the front end is very convenient, allowing free access to the flues and steam pipes. I consider the Spark Arrester as a whole a great improvement over the old "Diamond Stack," throwing no fire, clean to ride after, and steaming well.

Yours truly,
G. H. PRESCOTT,
Supt. M. P. & M.

TERRE HAUTE, IND., Feb. 5, 1884.

Mr. Geo. D. Hunter:

DEAR SIR.—I fully concur in the opinion which Mr. G. H. Prescott, Supt. Motive Power of this Line has given in regard to the merits of your Spark Arrester, and I say that I know of no better arrangement in use for effecting the purpose for which it was designed. I have been cognizant of the experiments you have made from the inception of this device to its latest improvement, and have formed my opinion from my own observations as well as from the testimony of the men who have handled the engines.

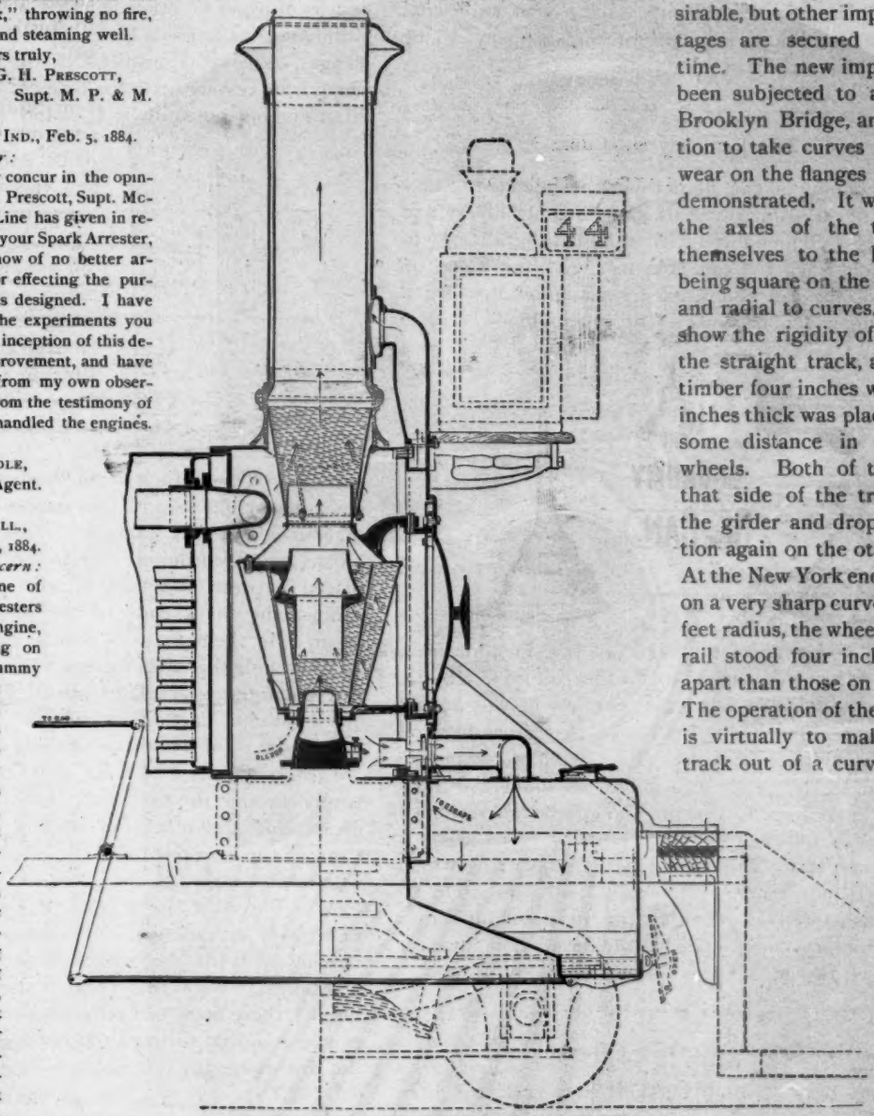
Yours truly,
CHAS. R. PEDDLE,
Pur. Agent.

DANVILLE, ILL.,
Feb. 6, 1884.

To whom it may concern:

We are using one of Hunter's Spark Arresters and Stack on our engine, 2, which is running on what is termed a dummy train, cylinders 15x22, hauling part of the way three cars and balance of trip five, distance fifty miles, in two hours and fifteen minutes, making thirty-eight and forty stops. Although not considered perfect when put on we notice quite a saving in fuel, engine making steam freely, (using words of Engineer, cannot run her out of steam) doing her work easy on account of large nozzle, and the great comfort of not having cinders back on the train. I consider it far ahead of the Diamond stack with cone netting and petticoat pipes. As regards all things in connection with the engine repairs the same from August to date have been one dollar and fifty cents, no material used. We intend to put on more of them as soon as we can. Ahead of all other devices in access to front end to make repairs.

ALLEN COOK, M. M. C. & E. I. R. R.



THE HUNTER LOCOMOTIVE SPARK ARRESTERS.

THE plan of using the enormous water power of the Alps for working electric railways in Switzerland appears to have taken a definite shape, the idea being to connect the towns of St. Moritz and Pontresnia by an electric railway four and three-fourths miles long, the motive power to be supplied by the mountain streams, the line, in case the plan proves a success, to be extended a considerable distance.

The American Radial Truck.

A TRUCK is made by the American Radial Truck Company, corner Atlantic and Third avenues, Brooklyn, New York, by means of which not only is assured the practicability of trains running in circuit, continuously on the same line of rails, to save cross-over switches, where such an arrangement of terminal tracks may be found to be desirable, but other important advantages are secured at the same time. The new improvement has been subjected to a trial on the Brooklyn Bridge, and its adaptation to take curves without extra wear on the flanges of the wheels demonstrated. It was found that the axles of the trucks adjust themselves to the line of travel, being square on the straight track and radial to curves. In order to show the rigidity of the axles on the straight track, a piece of oak timber four inches wide and three inches thick was placed on one rail some distance in front of the wheels. Both of the wheels on that side of the truck mounted the girder and dropped into position again on the other side of it. At the New York end of the bridge, on a very sharp curve of but ninety feet radius, the wheels on the outer rail stood four inches further apart than those on the inner rail. The operation of the Radial Truck is virtually to make a straight track out of a curve; the flanges of the wheels binding the inner edges of the rail in passing a curve no more than they do upon a straight track.

In the ordinary car truck there is but one point of attachment to the car body, namely that at the king-bolt center; in the Radial Truck there are two bearing surfaces and points of control. These are, first, on the forward pair of wheels of each truck, on which is a fifth-wheel attachment; and, second, over the second pair of wheels, where is a sector attachment. The radial device has transverse bars running diagonally from a frame work, the points of attachment being near to the inner plane of the wheels. On a straight track the rigidity of the entire car body tends to hold the trucks straight, and prevents them from getting out of a straight line; in the Radial Truck the controlling point of attachment of the car body

is at the fifth wheel, and this is placed immediately under the end sill of the car. From this attachment at the extreme end of the car a better control of the car body is obtained than is the case with the ordinary standard truck, the overhanging weight from the king-bolt center to the end of the car being done away with.

The American Radial Truck was invented by Walter Youmans, No. 169 West Tenth street, New York city. Wm. J. Richardson is manager for the company, at the address given in the first paragraph.

The Economy Oil Can.

THE Economy oil can, figured here, is intended to take the place of the ordinary can used in oiling machinery, and consists of a common can with a funnel-shaped attachment which, when the can is in use, rests like a cap on the top of the can, and is itself surmounted by a small rubber ring, which becomes a cup when slid down upon

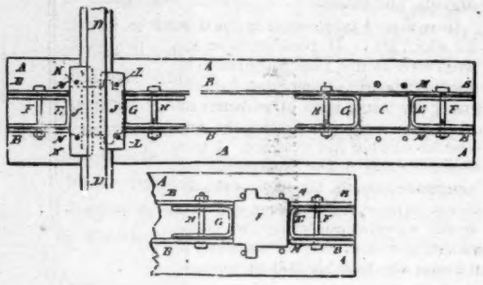
the funnel and protects the fingers of the operator from the oil. When it is desired to fill the can from a bottle or other vessel, the nozzle is unscrewed, the funnel slipped off and inserted in the top of the can, and the oil poured through it. Loss or spilling of oil is completely prevented, and when the can is full, the funnel is readily removed and slipped over the top of the nozzle down upon the can, followed by the rubber ring. The whole is kept in place by its close fit and by the rubber ring, which counteracts any tendency to work loose. In point of cleanliness as well as economy, the Economy oil can is a marked improvement upon the old form. The inventor is James H. Brown, of Ottawa, LaSalle County, Illinois.

Van Orden's Metallic Railroad Tie.

CHARLES VAN ORDEN, Catskill, New York, has been granted United States letters patent on his improvement in metallic railroad ties. The object of his invention is to provide metallic ties for railroads, constructed in such a manner as to be economical and trustworthy in use, and which will allow the rails to be taken up and replaced without disturbing the ties, and the blocks or cushions to be taken out and renewed without disturbing the ties or rails.

It consists of a metallic railroad tie constructed, with a base plate having parallel flanges, and blocks placed between the flanges to support the rails, and kept in place by U-shaped bars secured to the parallel flanges. Upon the tops of the rail-supporting blocks are placed plates, to prevent the rails from wearing the blocks. Upon the end parts of the flanges of the base plate are formed shoulders for the outer edges of the rail chairs to rest against, to prevent the rails from spreading.

To describe it more particularly: The base of the tie is made wide to prevent it from being pressed into the road bed. Upon the opposite sides of, and equally distant from the central line of the base plate are formed, or to it are attached, two parallel flanges, between which are placed blocks of paper or other suitable material, made of such a thickness as to rise a little above the upper edges of the flanges, to serve as cushions to the rails and to prevent them from resting upon the flanges. The blocks are kept from moving outward by U-shaped bars placed between



the flanges, with their bends resting against the outer ends of the blocks, and the arms of which are secured detachably to the flanges by bolts or keys. The blocks are kept from moving inwardly by U-shaped bars placed between the flanges, with their bends resting against the inner ends of the blocks, and which are secured in their places by rivets passing through them and through the said flanges. The bases of the rails rest upon the wear plates placed upon the blocks, and are kept in place by chairs, which can be made in two pieces or in any other suitable manner. The chairs are secured in place by bolts, some of which pass up vertically through the base plate and the outer parts of the chairs, and the others in inwardly inclined directions through the base plate and the inner parts of the chairs. The outer edges of the chairs rest against shoulders formed upon the outer parts of the flanges to hold the rails from spreading. The wear plates are kept from moving upon the blocks by shoulders and the bolts before mentioned. With this construction, by loosening the nuts of these bolts and removing the bars, the cushions can be removed through the outer ends of the ties without disturbing the ties.

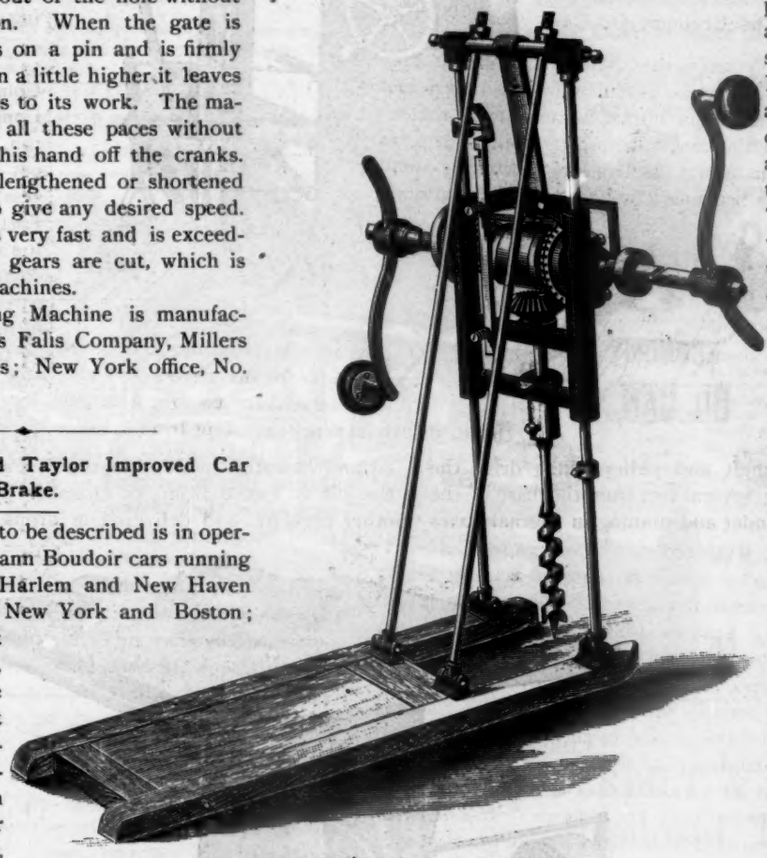
DEAN BROS. Steam Pump Works, Indianapolis, have recently received orders for their independent air pump and condenser, from the Logansport, (Indiana) Electric Light Company; Clinton (Iowa) Water Works; Yaeger Mill Company, Kane, Illinois, and Brush Electric Light Company, Indianapolis. Dean Bros. are getting out patterns for a new line of duplex pumps.

IT has been found that the tractive force, or friction, between the wheels of a car and the rails on an electric railway is increased twenty per cent. when the current is put on—that is to say, the electric current passing from the rails, as conductors, to the metal wheels of the cars, on its way to the electric motor, actually increases the grip of the wheels by this amount.

Carpenter's Boring Machine.

THIS improvement, to which reference was made in the March number and of which we are enabled to present an illustration, is built of steel, with steel braces. The upright rods (one-half inch in diameter) pass through the auger gate, which slides up and down on them, and can by no possibility fly the track. By the half turn of a set-screw the frame can be adjusted so that the auger will bore at any desired angle. When the right depth is reached, the auger comes to a full stop; the next turn in the same direction loosens the screw; then it falls into gear, and is drawn out of the hole without changing the motion. When the gate is drawn up it catches on a pin and is firmly held, but when drawn a little higher it leaves the pin and descends to its work. The machine goes through all these paces without the operator taking his hand off the cranks. The cranks may be lengthened or shortened at pleasure, so as to give any desired speed. This machine works very fast and is exceedingly durable. The gears are cut, which is not usual in other machines.

Carpenter's Boring Machine is manufactured by the Millers Falls Company, Millers Falls, Massachusetts; New York office, No. 74 Chambers street.



CARPENTER'S BORING MACHINE.

The Van Wie and Taylor Improved Car Brake.

THE brake about to be described is in operation on the two Mann Boudoir cars running on the New York, Harlem and New Haven Railroad, between New York and Boston; also on the car built for Adelina Patti, belonging to the same company. It is giving satisfaction. The manufacturers are the Van Wie and Taylor Brake Company, Troy, New York.

A plan of the device shows a Westinghouse air cylinder, and an angular arm put on the piston of the air cylinder, and having a hole long enough to admit a rod passing through it to work freely; said rod has a fixed collar. A guide allows an extension on the angular arm to pass through it, so that the side draw cannot bend the piston rod out of cylinder. The segment of toothed levers attached to the rod passing through the angular arm, meshes in with a gear having a chain pulley underneath, which is cast in one piece. On both the top and bottom of the teeth a flange is cast, projecting out to the point of tooth, so that it forms a guide for the toothed levers before mentioned, and also provides that the teeth cannot be broken out of gear or the levers get out of mesh. Rods going to the truck levers have a piece of chain on the end, which winds around a pulley. Levers standing perpendicularly at the back end of the truck are hung to the spring plank by a movable fulcrum which slides backward or forward, equalizes the wear of the brake shoes, and also applies an equal pressure to all wheels at the same instant. Rods connect the perpendicular levers at the back end of the truck, by an eye-bolt, and play when the spring plank oscillates. The eye-bolt is provided with a nut which takes up the slack or wear of the brake shoes, and adjusts them to the wheels.

It is claimed for the brake, described in as perfect a manner as the absence of a cut makes possible, that it will not slide the wheel under any circumstances, because one of the trucks is not used as fulcrum for the other, but the power is applied on all the wheels instantaneously. Moreover, jarring and jerking are claimed to be done away with by use of the Van Wie and Taylor brake, whether applied to the wheels of a train either by hand or air. Other advantages claimed are that it weighs 150 pounds less than the brake now in use, having no double levers and lever guides in trucks; it does not need repairing; the piston rod of the air cylinder cannot bend if taking up brakes is neglected; it is not necessary to adjust the brakes but once during the life of a set of brake shoes, and only two minutes to a car are required to adjust them; and the brake shoes are worn equally, so that when one is worn out the whole set needs to be changed.

CAR coupler inventors, says the *Railway Age*, will be encouraged to know that the Massachusetts house has finally passed a bill which provides as follows:

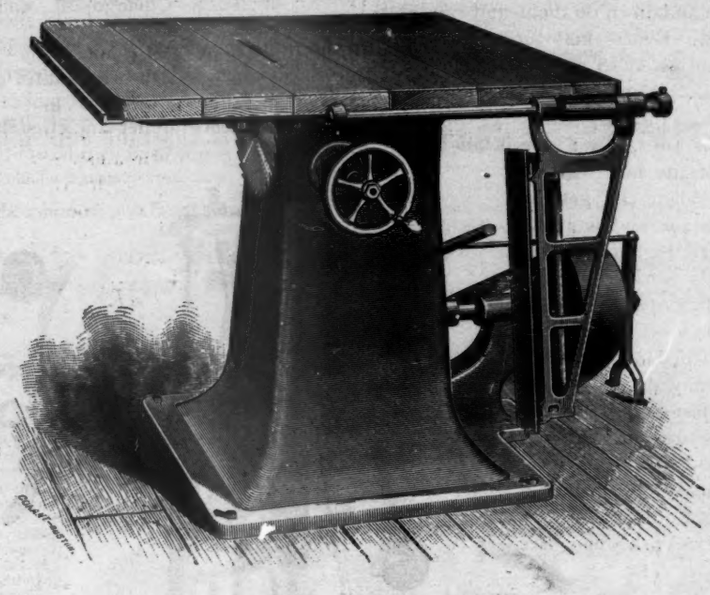
Every railroad company operating a railroad or any portion of a railroad, wholly or partly within the state, shall place upon every freight car hereafter constructed or purchased by such corporation, and upon every freight car owned by such corporation of which the coupler or drawbar is repaired by it with intent to use such car, such form of automatic or other safety coupler at each end thereof as the board of railroad commissioners may prescribe.

THE Schenectady Locomotive Works have recently received an order for ten locomotives from the Wisconsin Central for use on the extension of that road from Chippewa Falls to St. Paul.

The H. G. Saw Bench.

AS INDICATED by the cuts, the principal features of this saw bench, made by Hobbs, Gordon & Company, Concord, New Hampshire, are its simplicity and compactness. It does not require more than one-half the ordinary amount of floor space, and is found to be a most efficient and convenient tool, easily managed, and very durable.

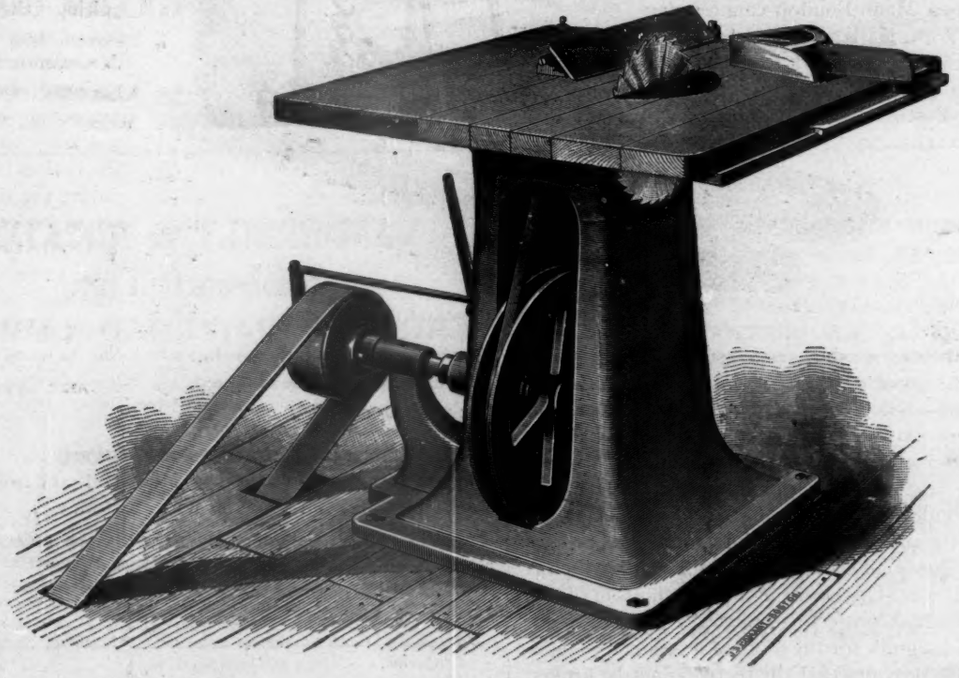
The frame of the H. G. Saw Bench consists of a hollow pedestal, cast in one piece, upon which is fastened the table, made either of wood or iron. A pivot joint is used to fasten the frame and table together, allowing the latter to be readily raised when the saw has to be changed, oil has to be applied, or for other purposes. Unlike most saw benches, the counter-shaft and pulley which drive the arbor, instead of being several feet from the base of the machine, are directly under and running in journal boxes cast to frame. This is readily accomplished by means of the manufacturers' method of transmitting power from one shaft to another, a method which also provides that the saw arbor can be raised or lowered, with hand wheel and screw arrangement, without changing the tension of the belt, at the same time also obtaining a large increase of power over the old way. For driver, the manufacturers use their patent self-lubricating pulley, which has been found to be perfectly sure and trustworthy in all respects. They also use their improved guides and rests for splitting, squaring, and mitering.



THE H. G. SAW BENCH.

THE Union Car Coupler Co., of No. 19 Congress street, Boston, Mass., whose patent is now being successfully used by the Eastern and the Boston and Maine railroad companies, has secured a contract for furnishing their coupler to the Maine Central railroad.

IN the Steam-cylinder Lubricator invented and patented by Washington L. Parker, of Chicago, the oil is forced from its chamber by hydrostatic or other pressure, and delivered in drops at one end of a vertical or horizontal glass tube, through which it is carried by and with an active current of water from the condenser.



THE H. G. SAW BENCH.

The Lake Shore and Michigan Southern Railway Co.

Treasurer's Office, Grand Central Depot,
NEW YORK, March 28, 1884.

THE BOARD OF DIRECTORS OF THIS COMPANY have this day declared a QUARTERLY dividend of TWO PER CENT. upon its capital stock, payable on THURSDAY, THE FIRST DAY OF MAY NEXT, at this office. For the purpose of this dividend, and also for the aunual meeting of the stockholders, for the election of Directors, etc., which is to be held on the 7th day of MAY next, the transfer-books will be closed at 3 o'clock P. M. on THURSDAY, the 3d day of APRIL next, and will be repened on the morning of FRIDAY, the 9th day of MAY next.

E. D. WORCESTER, Treasurer.

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Daniels Paint Mills.

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These Mills are now in use by nearly all the large manufacturers in the United States and Canada.

I also build a variety of Mills for the more common paints both dry and in oil. These common Mills are without the cooling appliances.

WILLIAM DANIELS,
Patentee and Sole Manufacturer,
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Manufacture Wrought Iron Pipes and Tubes.

National Special Semi-Steel LOCOMOTIVE Tubes.

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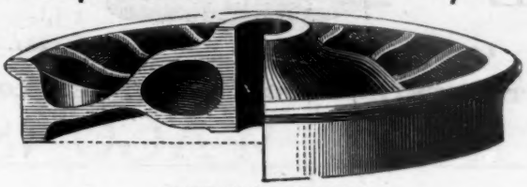

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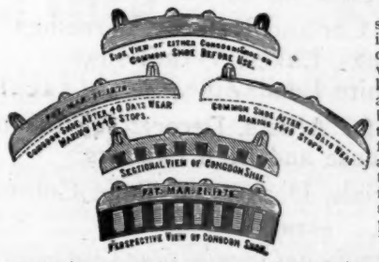
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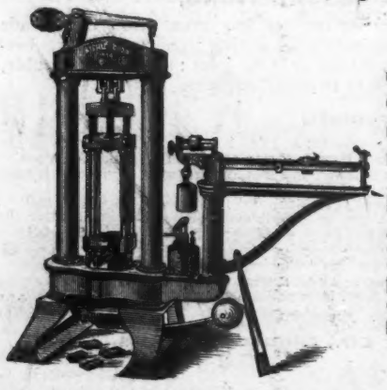

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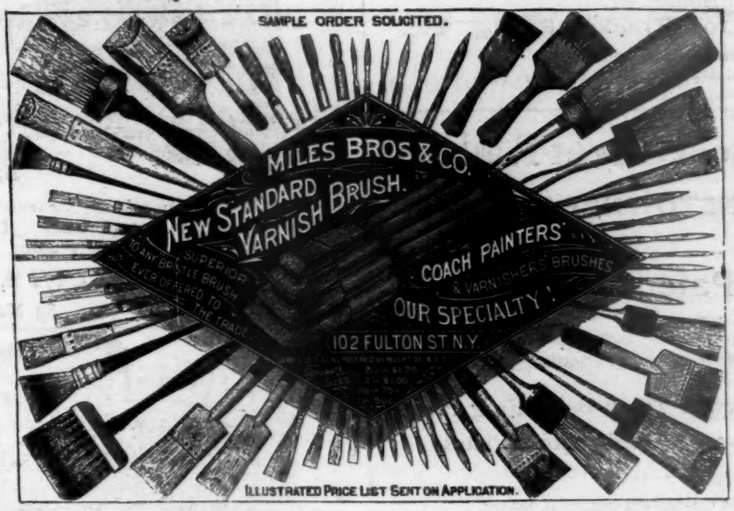
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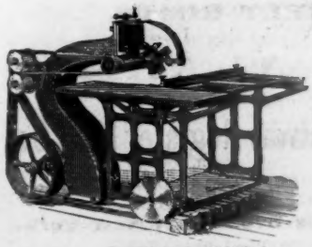

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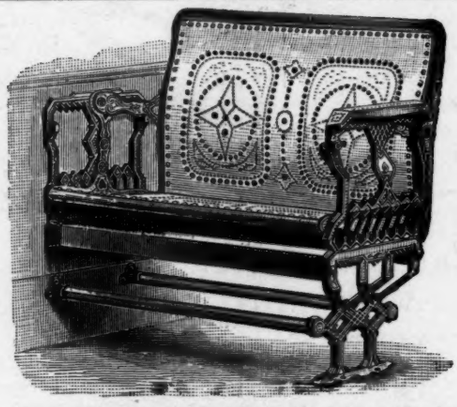

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